

QA Brief

THE QUALITY ASSURANCE PROJECT'S INFORMATION OUTLET

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QA Project Editorial

The Future of Evidence-Based Medicine in Developing Countries

James R. Heiby, MD, MPH

USAID Project Manager

ATTEMPTS to explain evidence-based medicine (EBM) to a layperson typically garner a “don’t you do that already?” response. But even health professionals may be forgiven if they don’t fully appreciate the sweeping implications of this apparently simple idea.

In general terms, healthcare has been based on scientific research and clinical observations for nearly a century. More recently, however, in the US and elsewhere, health services research began to raise new questions about the basis for the healthcare patients actually receive. Studies that are now classics revealed that patients with identical health problems frequently receive widely different care in different locations. Upon closer examination, most of this variability could not be justified. Large numbers of patients were receiving services that were at best sub-optimal and often wasteful.

Ironically, a major factor in variable practices is the explosion of information itself. With tens of thousands of studies published every year, keeping current is just too much for a busy clinician. In response, professional organizations began to develop evidence-based clinical guidelines. These guidelines are designed to distill current evidence on a clinical issue, specifically for application by the busy clinician. To their critics, the guidelines resemble a cookbook: They offer the

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clinician concise directions on the assessment and treatment of a particular condition. But, with surprisingly little dissent, these guidelines have quickly become a central element of healthcare in industrialized countries. Middle-income countries face similar issues and are developing their own EBGs.

In developing country health systems, EBGs raise different, but hardly less sweeping, issues. These countries appropriately focus on a more narrow range of basic services. But this care also shows variation, with many patients receiving less efficacious and wasteful care. WHO and other international organizations have promoted guidelines covering virtually every basic service, from child illness to prevention of mother-to-child transmission of HIV. But here, the issue is not an explosion in information. Rather, we have learned that most health systems are not equipped to support the use of EBGs. Without new strategies, these guidelines seem to be destined to have limited impact on what providers actually do. Evaluations often find that the care actually received by patients meets guidelines less than half the time. What's the problem?

Some of the symptoms are familiar. Guidelines developed in the capital do not reach the providers who are supposed to follow them; copies of guidelines that do reach the periphery are locked away rather than at the clinician's fingertips. Even providers that have

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received special training and reference materials often show low and declining levels of “compliance.” In fact, these symptoms confirm lessons from earlier experiences in industrialized countries—to change provider behavior, providing the guideline itself and related technical training is necessary, but not sufficient. And, as you will find in this issue of the *QA Brief*, we’ve learned a lot about what more needs to be done.

One set of issues involves the nature of the guideline itself and how it was developed. The evidence base is only part of the picture. Equally important, the guideline should be feasible for ordinary providers to follow and its content should be acceptable to them. These providers, as well as technical experts, have an important role in developing the guidelines they will be expected to carry out.

In some cases, however, feasibility can be addressed by changing the health system rather than the guideline. Like any complex organization, health systems have rules for many administrative and support tasks that must be carried out over and over. The rationale for these rules may be long forgotten, but it can be a serious obstacle implementing new guidelines.

If the relevant parts of a health system were all designed to support EBGs, what would it look like? A well-defined approach is available for this purpose, but it is little known outside industrial country health systems. Articles that follow document the potential of this new approach to guidelines, the systematic re-design of the way services are carried out.

Individual clinicians who wish to follow a given guideline may simply make errors. The more complex the guideline, the more difficult it is to remember its content. If the health worker deals with a given situa-

tion infrequently, performance suffers even more. In many cases, a written job aid can dramatically improve performance. Producing an effective job aid obviously requires expertise in the clinical content. Many health professionals are unaware, however, that there is a distinct state-of-the-art for job aids. The field of human performance technology has produced well-tested principles and methodologies for designing a job aid that works, whatever the topic. These important new methodologies are introduced and illustrated in this issue.

Managers are often puzzled when assessments show that health workers are not following program guide-

lines, despite training and access to the guidelines. Quality improvement methodologies provide a framework for analyzing problems like this and developing promising solutions to test. This general problem-solving approach is a highly promising strategy for supporting implementation of EBGs, but it remains under-

utilized. Concrete examples described in this issue suggest the need for an institutionalized problem-solving capacity.

Not long ago, managers of health programs implicitly assumed that health workers with the appropriate training and supplies would provide acceptable healthcare. Evidence-based clinical guidelines challenge this basic assumption. The logic of the guidelines demands that managers take on new responsibilities for the quality of care in their programs. As the articles that follow will illustrate, robust new tools are needed.

The field of human performance technology has produced well-tested principles and methodologies for designing a job aid that works, whatever the topic.



A Framework for Clinical Quality Improvement: Integrating Content of Care and Process of Care

M. Rashad Massoud, MD, MPH

Associate QA Project Director, Russia, NIS, Asia, and the Middle East

A story that is well known because it is so often encountered is that of physicians, nurses, and health workers who receive training outside their organizations, then return to their organizations keen to implement what they have recently learned. More often than not, they encounter difficulties in trying to implement the new knowledge. Sometimes these difficulties are resolved and all ends well. In other cases, these difficulties are not resolved, or if the initial difficulties are resolved, various other obstacles come up. In such cases, a lot of frustration may be created, and the people who wanted to implement what they learned at the training start to give up, and eventually return to doing what they used to do prior to the training. In many instances, the reason why they could not implement the new knowledge is due to the incompatibility between the new knowledge and the way work is organized in their organizations.

Introduction

This article discusses one of the key frameworks in improving clinical quality, the integration of the content and the process of care. It builds on Paul Batalden's Framework for the Continual Improvement of Healthcare,¹ defines what is meant by the content and the process of care, and explains the importance of integrating content and process of care in order to bring about improvements in healthcare quality.

Background

Much of what is referred to today as healthcare quality improvement methodology is derived from Total Quality Management (TQM), which has been successfully applied in the manufacturing and service industries. The principles and methods that TQM applied in industry form the basis for quality improvement in healthcare. TQM in industry emphasized meeting and exceeding customer needs and expectations, and re-designing processes of service delivery or product manufacturing. This emphasis has been imported to healthcare quality improvement and is a key feature of the methodology. However, one of the important limitations of the TQM industrial model when applied to healthcare is that a critical component of providing quality healthcare—the clinical content of care—is not explicitly addressed in the industrial model. For example, in improving the system of hypertension care, it is not enough to meet or exceed patient needs and expectations, and to improve the way in which the processes of healthcare delivery are organized. It is equally important to ensure that the clinical care being provided through these healthcare processes is the scientifically correct choice and that it is compatible with the currently available medical evidence.² This limitation has often been missed in applying TQM to healthcare.

¹ Paul B. Batalden, MD, Patricia K. Stoltz, PA-C, A Framework for the Continual Improvement of Healthcare: Building and Applying Professional and Improvement Knowledge to Test Changes in Daily Work. *The Joint Commission Journal on Quality Improvement*, Volume 19, Number 10, October 1993.

² Evidence-based medicine can be defined as "The conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients" – source: *British Medical Journal*, 1996; 312:71-72 (13 January).

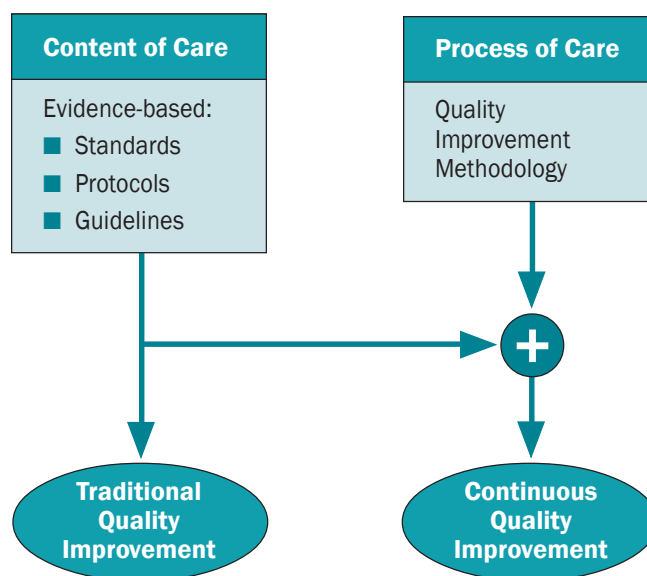
Paul Batalden's *Framework for Continual Improvement in Healthcare*

In their above-referenced article Batalden and Stoltz addressed the limitations in the existing frameworks on how improvement can be achieved in healthcare. The article contrasts traditional and continual improvements in healthcare. Traditional improvement results from advances in professional knowledge, including knowledge of the content of care, or the discipline itself, as well as professional values. Continual improvement in healthcare results from the combination of professional subject matter knowledge and the knowledge of improvement. The knowledge of improvement includes knowledge of systems, variation, psychology of work and change, and the theory of knowledge (how new knowledge is generated). They propose a new approach to improving healthcare quality and describe the elements of a system that is capable of continually improving. The QA Project's understanding of clinical quality improvement, which is described in this article, is based on Batalden's Framework for Continual Improvement in Healthcare.

Integrating the Content and the Process of Care

Over the past decade, the central role of integrating content of care with the process of care has become more evident through field experiences. The provision of healthcare includes two types of components: what is done (clinical content) and how it is done (the processes and systems of healthcare delivery or the way healthcare delivery is organized). Although improvements can be achieved through addressing either of these components on its own, the most powerful impact occurs when both are addressed in an integrated manner. Thus, to maximize clinical quality improvement, it is important to update the clinical content, as well as to enhance the capacity of the systems and

Figure 1
The Framework for Clinical Quality Improvement



Adapted from: Paul Batalden, Patricia Stoltz, A Framework for Continual Improvement in Healthcare, The Joint Commission Journal on Quality Improvement, October 1997

processes of healthcare delivery to enable the implementation of the updated clinical content.

Evidence-Based Medicine as a Basis for the Clinical Content

Improving clinical quality necessarily includes updating the clinical content of care. Much emphasis today is placed on strengthening clinical practices, which are evidence-based, and doing away with practices for which evidence is insufficient. As part of updating clinical content, one may find that there are some aspects of care that are neither supported nor negated by strong evidence. This is a common situation and reflects the state of the art in clinical medicine. Even in such cases, it is important to



acknowledge the levels³ of evidence available and to act accordingly. In making decisions regarding clinical issues, practitioners have no option but to base them on the highest available level of evidence, even if it is not very high. However, it is different when they do so fully conscious of what the level of evidence is. In other words, a physician may opt in a certain situation to carry out a procedure, for which the evidence is not strong, because this is the best available option, but in doing so, he or she should be conscious of this.

Organization of Care

The clinical content of care is delivered to patients through healthcare delivery processes and systems. Every process or system has its characteristic features. It is important to recognize and understand key features of the processes and systems in order to enable the implementation of new content through them.

These features may directly stem from the nature and original design of the process or system itself. Alternatively, they can stem from other processes and systems within or even outside the organization.

For example, in implementing a new system of administering prophylactic antibiotics in surgery, the existing processes and systems did not permit the prophylactic antibiotic to be administered as part of the preoperative medication. Prophylactic antibiotics were being prescribed and their administration started often long before the patient received preoperative medication. The process of prescribing and administering the antibiotics needed to be changed such that the anesthesiologist performed this as part of the pre-

operative medication. This characteristic feature is part of the process of prescribing and administering prophylactic antibiotics itself. However, making these drugs regularly available in the operating theatre so that they are administered as part of the preoperative medication is part of another process: the process of pharmaceutical distribution in the hospital. In designing the new process of prescribing and administering prophylactic antibiotics, the nature of the pharmaceutical distribution process had to be understood and factored in. Part of the new process of prescribing and administering prophylactic antibiotics has characteristic features, which stem from another process, the pharmaceutical distribution process.

The features of a process may exist because they were originally designed that way or alternatively, because they became so by default. Sometimes they can be a mixture of both. Moreover, processes may undergo

subtle changes from their original designs as a result of the influence of various internal and external factors. There is a common myth that if a process was designed in a certain way, it will continue to operate in that way. This is often not the case, because processes and systems may

undergo these subtle changes. For example, it was quite revealing to see that the system of care for neonates with respiratory distress syndrome had over time undergone so many different changes that it became a different process in each of the five facilities. These five facilities originally had the same system and the staff of the five facilities thought that they were all still implementing it according to the original design.

The features of a process may exist because they were originally designed that way or alternatively, because they became so by default.



³ For example the 4 level (including 6 level 2 sublevels) classification of the Levels of Evidence can be the National Health Service Center for Reviews and Dissemination (U.K.): *Undertaking Systematic Reviews of Research on Effectiveness: CRD Guidelines for those Carrying Out or Commissioning Reviews. CRD Report No. 4. York: University of York, 1996.*



In order to make clinical improvements in healthcare, it is important to realize that the design features of the existing processes and systems for all the reasons discussed above may, or may not, enable updated clinical content to be delivered. In some instances where the design features of the processes and systems allow the implementation of new clinical content, they may do so inconsistently or with a high likelihood of error. Therefore, understanding the organization of healthcare delivery and what limitations the existing processes and systems can place on implementing updated or new clinical content is an essential component of clinical quality improvement. Key to successful clinical improvement is not just to understand these limitations, but to re-organize the systems and processes of healthcare delivery to enable the implementation of new clinical content.

Conclusion: The Importance of Integrating the Content and Process of Care

The moral of the story at the start of this article is that in order to make improvement, it is usually not enough to focus on improving the knowledge or skills of individuals through training and development. New, evidence-based, content knowledge should be accompanied by relevant changes in the processes and systems in which this new knowledge will be implemented. These changes will enable individuals to correctly implement their new knowledge and skills in a consistent and reliable fashion.



The Effect of Job Aids on Improving Adherence to Cotrimoxazole for Childhood Pneumonia in Niger

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WE developed a set of client and provider job aids to improve adherence to antibiotic regimens, specifically oral cotrimoxazole, for the outpatient treatment of children with pneumonia in Niger. Job aids have been shown to improve work performance among healthcare providers by enhancing recall and promoting compliance with standards. Child nutrition cards maintained by mothers and instructions for preparation of ORS are examples of client-based job aids.

Using formative research, we developed appropriate messages and strategies for behavior change for caretakers of children with pneumonia. A local artist drew images of mothers giving their children the antibiotic to convey messages on proper administration and storage, and completion of the entire five-day course. These images were displayed on one side of an envelope for the cotrimoxazole, with the reverse side depicting the antibiotic regimen (dose, frequency, and number of days). The images were then repeated on a counseling card and poster for the health worker to use. A large image of good interpersonal communication by the health worker was also depicted on the poster. The Niger Ministry of Public Health developed a training program for health workers on interpersonal communication and use of the medication envelopes, counseling card, and poster.

An efficacy trial was then conducted to test the effectiveness of the job aids. Would there be a difference in adherence to the antibiotic regimen in the experimen-

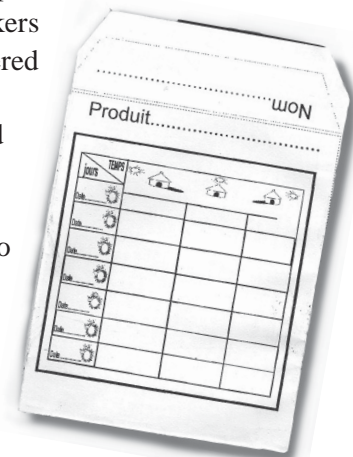
tal sites that used the job aids? Did the job aids make a difference in adherence in some clinics rather than in others, and why? We found that healthcare workers were giving only three days of the recommended five-day course of treatment at the outset of the study, as supplies of the antibiotic were low. Therefore, we provided enough cotrimoxazole so that the full, five-day course could be given. Would there be a difference in adherence if five days of pills were given as compared to three days?

A sample of 675 caretakers of children with pneumonia (348 in the experimental group and 327 in the control group) from eight health centers (four experimental and four control) were visited at home four to five days after the initial consultation. The dependent variable, adherence to the antibiotic regimen, was measured with a pill count on day four or five after the clinic consultation. Two measures were calculated with these data:

- 1) the proportion of caretakers who adhered

to the antibiotic regimen, and 2) a ratio of observed pills to expected pills. A ratio closer to “1.0” indicated greater adherence to the antibiotic regimen.

There were no significant differences between the experimental and control groups for



the children's characteristics (age, birth order, sex) or the mother's characteristics (age, educational level, marital status). However, household characteristics and characteristics of the health center visit did differ significantly. The size of the household was larger in the control group (9.3 versus 7.4 persons) and households in the experimental group had more radios (68% versus 44%). The control group lived farther away from the health center than the experimental group (2.9 versus 2.3 km), and the caretaker stated that improvements were needed in care at the health center more often in the experimental group (75% versus 42%). In addition to cotrimoxazole, more children were prescribed aspirin in the control group (49% versus 36%); however, more children were prescribed chloroquine in the experimental group (93% versus 63%). In the initial results (Table 1), the experimental group had greater adherence to the antibiotic regimen than the control group, even if the full five-day course of medication was dispensed at the initial visit.

Further analysis using a multi-factorial ANOVA design was completed to assess the effect on patient adherence of the interaction between the use of job aids and type of health worker. We found that adherence was significantly less in caretakers attending clinics staffed with lower-level health workers; however, adherence was better in those clinics staffed with lower-level health workers using the job aids (Adj $R^2 = .101$, $p < .001$.) (Figure 1).

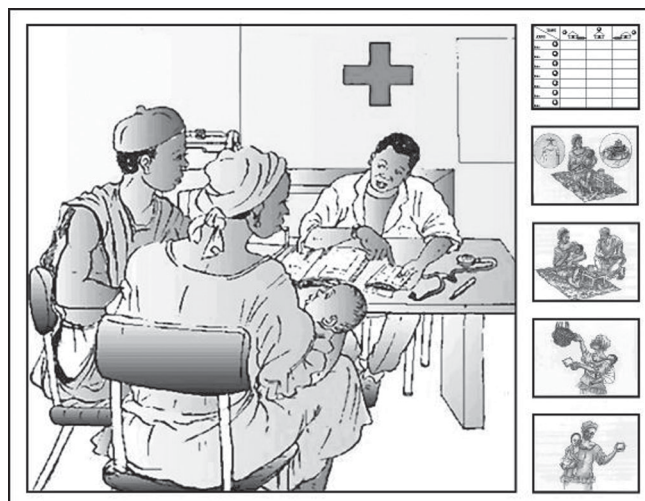


Table 1
Description of Differences in Experimental and Control Group for Dependent Variables*

	Control Group	Experimental Group	Level of Significance
Patient adherence (% who adhered to regimen)	76%	90%	<.001
Patient adherence (ratio of observed to expected pill count)**	.929	.980	< .001
3 days of medication received initially	.920	.980	< .001
5 days of medication received initially	.952	.979	< .001
Kept follow-up appointment (% yes)	58%	79%	< .001
Maternal knowledge (% correct)			
Number of pills	99%	99%	NS
Number of times per day	97%	93%	.01
Number of days	98%	99%	NS
Child's health (mother's perception, % yes)			
Improved completely	35%	47%	.002
Improved a little	65%	53%	.002
Still has a cough	46%	38%	.03
Still has a fever	25%	13%	< .001
Still has nasal discharge	42%	28%	< .001
Medication storage (% correct)	87%	91%	.04
Used clean water to mix medication (% correct)	73%	94%	< .001

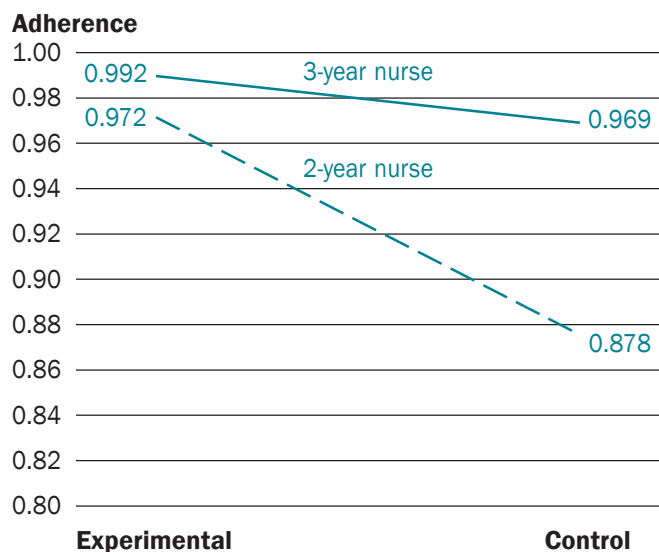
* Patient adherence, follow-up appointment, maternal knowledge, child's health, medication storage, and preparation

** Note: Ratio closer to 1 indicates greater adherence.



Figure 1

Adherence to Antibiotic Regimen by Type of Healthcare Worker and Study Group



Note: Adherence measured as ratio of observed to expected pill count.

The results indicate that the job aids did have an effect on improving patient adherence, especially when used by lower-level health workers. Country IMCI programs could use a set of job aids for clients and providers, such as those described here, to improve counseling and caretaker adherence to medication regimens.





Pre-eclampsia in Uganda: Quality Care with a Case Management Map

Barbara Kerstiëns,¹ MD, MPH, Technical Advisor and Program Officer, Agence Européenne pour le Développement et la Santé, and Barton R. Burkhalter, PhD, Associate QA Project Director, Operations Research

PRIOR to the introduction of case management maps (CMM), pre-eclampsia was a major problem in the maternity ward of Uganda's Jinja Hospital, located in Jinja District. In the year before CMM, 11 percent of all women admitted with pre-eclampsia, a dangerous complication of pregnancy, progressed to eclampsia, and 38 percent of the births to pre-eclamptic women were stillborn (Table 1).

Preliminary findings of a study by the Quality Assurance (QA) Project and Jinja Hospital indicate that in the 12 months after case management maps for pre-eclampsia were introduced, 8 percent of pre-eclampsia cases progressed to eclampsia, and stillbirths dropped to 18 percent of all births to women admitted with pre-eclampsia.

Pregnancy-induced hypertension (PIH) is a complication of pregnancy always characterized by elevated blood pressure and sometimes by protein in the urine and edema after the 20th week of gestation. During pregnancy, PIH can progress to pre-eclampsia, characterized by headaches, vomiting, impaired vision, abdominal pain, and further increase in blood pressure, urine protein, and edema.

At Jinja, pre-eclampsia was defined as any woman presenting with blood pressure of 140/90 mm Hg or more and/or signs of proteinuria, headache,

or dizziness.² A multidisciplinary team at the hospital developed and implemented the pre-eclampsia CMM with technical assistance from the QA Project. The team reviewed and modified existing case management standards, using the national Uganda PIH and World Health Organization Safe Motherhood guidelines as the basis for the CMM (Figure 1).

To implement the CMM, the team recommended several changes in hospital policies and practices, including standardizing drugs, closely monitoring maternal blood pressure and fetal heart rate, timing convulsions, testing urine protein, and recording and initialing all actions taken. Hospital staff participated in two one-day training sessions. The development and implementation process took three months.

The hospital staff embraced CMM, and used CMM universally almost from the beginning. In the 16 months following its introduction, 63 of the 64 women admitted for pre-eclampsia were managed using the new CMM. A staff survey found very positive attitudes towards the pre-eclampsia CMM. They said it fostered self-confidence (especially in low-level staff) and gave patients confidence. They said it also resulted in improved communication between nurses and patients, improved care because patients in need were easily identified, better management of drugs, and more vigilant attention by the laboratory and pharmacy.

¹ Barbara Kerstiëns, MD, MPH, was the principal investigator for this project and undertook all fieldwork and data analysis, in cooperation with Jinja Hospital team. Dr. Kerstiëns and Barton R. Burkhalter, PhD, wrote this summary of the project. Drs. Agel Akii, Nazarius Mbona, and Abby Zziwwa from the Jinja Hospital Team contributed in major ways to the project, in addition to numerous contributors from Jinja Hospital and the Uganda Ministry of Health.

² In the most severe cases, pre-eclampsia progresses to eclampsia, characterized by convulsions. If untreated, eclampsia could result in death from brain hemorrhage or from failure of the heart, liver, or kidneys. Pre-eclampsia is associated with increased stillbirths, especially if untreated.



Figure 1

Pre-eclampsia Case Management Map Used at Jinja Hospital

Case Management Map (CMM)

Pregnancy Induced Hypertensive Disorders

Name _____

Date of admission ____ / ____ / ____

Referred ☐ yes ☐ no

Identification number _____

Serial / IP number _____

Starting Page _____

	Date ____ / ____ / ____			Date ____ / ____ / ____			Date ____ / ____ / ____			Date ____ / ____ / ____		
	D	E	N	D	E	N	D	E	N	D	E	N
Check 3x/day												
Blood Pressure												
Systolic												
Diastolic												
Fetal Heart Rate												
Convolutions*												
Initials =>												
Check 1x/day												
Edema												
Weight												
Hyperreflexia												
Proteinuria												
Give												
Inderal 80 mg BD												
Aldomet 250(-500 mg) tds												
Diazepam 5 mg tds												
Counsel												
Restricted salt												
Bedrest left side												
Check Newborn Breastfed*												

* or ☐ = Possibility of critical event

Jinja Hospital – Maternity – 1999



Table 1.

Results from Developing and Introducing a Pre-eclampsia CMM in Jinja Hospital

Indicator	Before (6/98-5/99)	After 1 (9/99-8/00)	After 2 (9/00-1/01)
Performance according to standards:			
Check and record blood pressure 3 x day	2.8% (1/36)	78% (39/50)	95% (20/21)
Check and record urine protein daily	5.6% (2/36)	64% (32/50)	86% (18/21)
Patient outcomes:			Odds Ratio
Cases that progressed to eclampsia	11% (4/36)	8% (4/50)	1.4
Stillbirths to women admitted for pre-eclampsia*	38% (8/21)	18% (7/38)	2.1

*Note: For some patients, birth outcome was not noted in the record.

In addition to reduced stillbirths and eclampsia, the pre-post evaluation found that patient monitoring improved dramatically with the new CMM. Correct monitoring of blood pressure jumped from 3 to 78 percent of pre-eclamptic patients, while correct monitoring of urine protein went from 6 percent up to 64 percent after the introduction of the new CMM (Table 1).

These encouraging results were due both to the CMM itself and to the process used to develop and introduce it. Key steps in the development process included:

- Reviewing and modifying existing case management standards at the hospital
- Team-building that generated enthusiasm and ownership, which, along with project resources, helped acquire needed equipment and supplies, reduce medicine stock-outs, and maintain sufficient clinical staff to guarantee proper monitoring.

An important and unanswered question is how much of the development process must be reproduced to achieve the same results when introducing the CMM in another hospital.

The results reported here are preliminary, because they have not yet been tested in other hospitals and because they may have been influenced in part by two other factors not yet analyzed:

- A few patients left the hospital before delivery and are not yet included in the analysis
- The Jinja team started work on another CMM for maternal hemorrhage about five months after introducing the pre-eclampsia CMM, and this may have contributed to the success of the achievements reported here





Job Aids Symposium Introduces Innovative Ways to Raise Health Worker Performance

Jennifer Lahaie, MA, Project Coordinator, Operations Research

THE first conference to exchange views and evidence on the state-of-the-art use of job aids took place at the International Trade Center in Washington, D.C. on May 24, 2001. The conference was jointly sponsored by the Quality Assurance (QA) Project, the U.S. Agency for International Development (USAID), and the Child Survival Collaborations and Resources (CORE) Group. The event shared innovative job aids that have been used successfully as a way to improve health. The symposium also identified future developments to make job aids more useful in the field for international health and child survival. More than 70 participants from 34 different organizations attended, including participants from public sector institutions, non-governmental organizations, professional associations, and donor and cooperating agencies.

The conference technical program addressed success stories, views, and evidence surrounding the use and evaluation of job aids.

The symposium consisted of presentations from a wide range of experts, and included a panel of professionals who shared experiences in the development, application, and evaluation of job aids. In the afternoon, participants had small group discussions focusing on specific applications of job aids across the healthcare field.

The highlight of the symposium included two keynote presentations by Tony Moore, president of Moore Performance Improvement, Inc. and a job aid expert. His first presentation discussed the latest information on job aids, focusing on an exact definition of job aids and the latest information about them.

Moore defined job aids, told participants how to identify them and when they should be used, noting that job aids are tools that should be used by workers every time they perform a specific task that will ensure consistency in performance. "Job aids are used on the

job while performing the task. It tells you when to and when not to take action, and tells how to do it. Job aids are like having a coach...a gentle guide," he added.

Moore emphasized that job aids may not be appropriate for all situations. For example, some tasks are physically constraining, making using job aids unreasonable or even dangerous for workers. A telephone repairman cannot

safely climb a pole and read a job aid in the form of a manual, Moore explained.

Additionally, in some workplace settings, speed is a crucial element for successful performance. Workers who routinely deal with healthcare emergencies should not rely on job aids to perform emergency tasks. Pilots should not plan to grab a job aid to brush

A successful job aid should reduce reliance on memory, and therefore reduce the guesswork surrounding a process for a worker. Job aids can be a system of conditional formulas, leading the worker through a process to a successful, appropriate end. Not only do job aids tell a worker when to perform a task, they also explain how to perform that task.



up on emergency landing procedures in the event of a crisis. In these instances, training for these emergency situations is more appropriate than job aids.

Leading practitioners in the field also shared their successes at the symposium. Paula Tavrow, PhD, QA Project Deputy Director of Operations Research, discussed the successful use of job aids to improve malaria treatment in Kenya, where the QA Project developed job aids for shopkeepers. The job aids, which explained new malaria guidelines, were distributed to private outlets by wholesale vendors. Shops receiving the job aids were significantly more likely to provide correct anti-malarial treatment information to mystery shoppers posing as customers.

Federico R. Leon, PhD, of the Population Council, discussed his work to improve family planning counseling in Peru. He helped create job aid method cards for counselors and clients for counseling in family planning. “The job aids represented a bridge in the relationship with the clients,” he said.

Wendy Edson, PhD, Senior QA Advisor, Operations Research, discussed how job aids helped improve caretaker adherence with antibiotic treatment for children with pneumonia in Niger. The QA Project developed a package of job aids for caretakers and health workers that included a counseling card, a medication envelope with dosage information, a poster, and a short training course on the job aids.

Linda Bruce, Senior Program Officer, Program for Appropriate Technology in Health (PATH), discussed using a Clean Delivery Kit, a pre-packaged kit of essential hygiene and cord-cutting supplies with pictorial instructions, in delivering a baby. She also discussed the Vaccine Vial Monitor, which contains heat and time-sensitive labels on vaccine bottles that change color when the vaccine can no longer be used. A simple companion job aid accompanying the monitor described the action needed based on the label’s color.



Job aids help improve performance of both health workers and clients.

Adrienne Kols, a consultant to the Johns Hopkins University Center for Communication Programs, discussed the Smart Patient client education project, which increased clients’ participation in family planning in Indonesia. Women in Indonesia are often shy and reluctant to ask questions; the project developed a job aid that encouraged women to express themselves. “The contribution of the job aids helped legitimize clients’ right to speak out,” she said.

Afternoon breakout sessions addressed job aids for non-literate populations, job aids to improve clinical services, scaling up job aids efforts, and electronic job aids. Moore also conducted a short course on how to design a job aid, and covered topics from content and type size to layout. Overall, he said, it is important to understand that not all performance problems can be solved with job aids. They can be useful in healthcare and should be considered a major strategy for improving the quality of healthcare service delivery.



Improving Compliance with IMCI Guidelines in Kenya

Paula Tavrow, PhD, Deputy Director, Operations Research; Lynette Malianga, BNS, RN, Senior QA Advisor; Muthoni Kariuki, PhD, Senior Program Officer, African Medical and Research Foundation; and Cynthia Young, MA, Senior Writer

THE Integrated Management of Childhood Illness (IMCI) guidelines developed by WHO and UNICEF are intended to improve the case management of sick, under-five children in developing countries. The guidelines prescribe a comprehensive assessment of the child's symptoms, a classification of each symptom, a treatment plan, and interactive caretaker counseling.

As part of a pilot program launched in Kenya in 1996, the Centers for Disease Control and Prevention (CDC) and the Government of Kenya trained about 80 health workers in IMCI in two rural districts in Western Province: Bungoma and Vihiga. Although the health workers' performance of IMCI appeared to be high immediately after training, a CDC assessment one year later indicated that performance had deteriorated considerably. In fact, focus group discussions led by the QA Project revealed that many providers had stopped performing IMCI regularly due to lack of support from the facility in-charges and staff, heavy staff workload, lack of IMCI-recommended drugs, and the amount of time needed to perform the IMCI algorithm.

To address these deficiencies in IMCI performance, the QA Project and the African Medical and Research Foundation (AMREF) developed an operations research study in these districts to test whether systematic team problem solving could be a low cost intervention to improve IMCI performance. The study entailed setting up facility-level problem-solving teams that were coached on how to develop, implement, and evaluate solutions to the problems identified in IMCI performance. Two-thirds of the facilities in the two districts were randomly selected to receive

team instruction and coaching. To keep the costs low, the study team did not seek to create a national or district-level quality assurance program. Instead, supervisors were taught to incorporate team coaching into their normal supervisory duties.

The study began with a baseline assessment in May 1998 of 70 IMCI-trained health workers in 35 government health facilities. The assessment revealed serious deficiencies in health workers' compliance with IMCI. Providers did not check for all four general danger signs in more than one-third of the children observed and did not check for all major symptoms in two-thirds of them. Less than 10 percent of the children received a complete assessment, and less than 20 percent of the children were correctly diagnosed. Only 60 percent of sick children received correct treatment.

Providers expressed frustration in performing IMCI. The majority said that IMCI took too long and made their workload too heavy. More than 80 percent complained that IMCI drugs and supplies were often unavailable.

In October 1998, the QA Project conducted a three-week course on quality assurance and team problem solving for 20 IMCI supervisors and district managers from the two districts. The training consisted of two weeks of classroom instruction, followed by one week of practicals in which the supervisors and managers set up teams in two facilities (one in each district). In each facility selected for team activities, the supervisors trained 8 to 12 staff on the facility's premises over five consecutive afternoons. During this training, the selected staff—who included the IMCI-trained providers—received feedback from the baseline



assessment on how well their facility had performed the IMCI algorithm.¹ Over the next six months, the supervisors created teams at 23 facilities and coached them in problem solving.

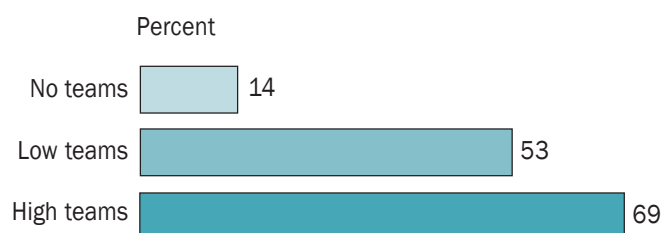
These teams were tasked with the problem of ensuring that all children at the facility received a complete IMCI assessment and classification. Regular practice of IMCI was considered a key step in improving the quality of health worker performance. Each team was coached to analyze why children were not getting the full IMCI assessment, to devise solutions to improve the situation, to implement the solutions, and then to analyze the effects.

In March 2000, a follow-up assessment was conducted to measure the impact of the team problem solving on IMCI performance. Results showed that facilities had implemented about three solutions on average. Facilities with teams had significant improvement in some aspects of IMCI case management when compared to facilities without teams. The difference was greatest among the facilities with teams with high problem-solving ability (as depicted in Figure 1).² These teams performed significantly better on assessment and counseling in comparison to the baseline, but not on treatment and classification.

The cost of setting up teams in facilities and coaching them for a year was about \$425 per facility. As of June 2001, about half of the teams in Bungoma district were still working on IMCI-related challenges, in part because of an ongoing project by AMREF to train providers in IMCI. In Vihiga district, transfers of key personnel and coaches' inability to visit the teams have adversely affected the sustainability of teamwork in the facilities.

Figure 1.

Percentage Point Improvement in IMCI Case Management,* by Existence and Ability of Facility Teams, 1998-2000



* Based on composite of the four IMCI case management aspects: assessment, classification, treatment, and counseling.

Given that the cost of training a provider in IMCI costs between \$250 and \$450, this study indicates that setting up teams and having supervisors coach them during their normal supervisory visits is a worthwhile investment for developing countries. However, such QA teams are most likely to be sustained where there is ongoing interest and support at the district level or they are part of a national/regional QA effort.

For more information, see the *Quality Assessment Case Study* "Assessing Health Worker Performance of IMCI in Kenya." To order the report, please access our Website at <www.qaproject.org> or write to qapdissem@urc-chs.com.



¹ The performance of all IMCI-trained providers at the facility was combined and average scores were developed for assessment, classification, treatment, and counseling.

² During the evaluation, all teams that were visited and interviewed were also asked to complete a 60-minute case study exercise. The six teams that achieved at least 60 percent on the exercise and who had implemented at least two solutions were determined to be "higher problem-solving ability" teams. All other teams were categorized as "lower problem-solving ability" teams.



Malawi District Advances Compliance with IMCI Guidelines

Lynette Malianga, BNS, RN, Senior QA Advisor; Mellina Mchombo, BNS, RN, QA Specialist; Catherine MacAulay, MPH, RN, Senior QA Advisor; Jennifer Shabahang, MHS, QA Specialist; and Bruno Bouchet, MD, MPH, Associate QA Project Director, Africa

THE Blantyre District Health Management Team (DHMT) and the Centers for Disease Control and Prevention (CDC) are introducing the Integrated Management of Childhood Illness (IMCI) as the new standard of care for sick children under five. The Quality Assurance (QA) Project has been asked to address system issues that limit the capacity of providers to comply with IMCI. A priority issue for the district was the limited time staff spent seeing patients. The DHMT estimates that IMCI requires at least 15 minutes, whereas contact time between providers and patients was believed to be less than three minutes.

The QA Project designed a quality assurance facility assessment (QAFA) tool that combines client flow analysis and a provider time and motion study. The QA coaches introduced health center staff to the QAFA instruments to measure three kinds of data: 1) patient waiting time, 2) contact time between patient and provider, and 3) the way providers spent their time between patient care (direct or indirect) and administrative activities. The first QAFA survey was conducted at Zingwangwa health center in April 2000. It revealed that the average waiting time for a sick child to see a health worker was 80 minutes and an average contact time of 1.8 minutes.

The Zingwangwa health center team, who were previously trained in QA, used this information to start a rapid problem-solving cycle where many changes in the organization of health services were implemented:

- The flow of patients was redirected, limiting congestion

- Patients were given numbered cards so that they would be seen on a first-come, first-served basis
- One IMCI-trained provider would see children only
- Providers who saw adults and who were also IMCI-trained would start seeing children as soon as finishing with their patients

After the reorganization of services, three more measurements were taken. By July 2001 contact time averaged 7.2 minutes and waiting time 10.2 minutes.

QAFA was replicated in four more health centers and revealed contact times ranging from 3.1 to 5 minutes. The Zingwangwa reorganization interventions were considered best practices by the DHMT, so identical changes were implemented in these centers. Follow-up data are being collected and analyzed.

Has the increase in contact time improved IMCI performance? We believe that reaching a higher level of performance (in this case, increasing contact time) will require other changes, such as additional staff. Because this is unrealistic in Malawi, the QA Project will work with the CDC and the DHMT to analyze IMCI performance during real working conditions. For instance, what components of IMCI do providers use? The QA Project will use this information to develop a job aid to help providers perform “as much IMCI as possible.” We also expect that the continued work to implement IMCI will provide a more in-depth understanding of the system and providers’ issues.





QA Intervention Improves Malaria Prescribing Practices of Private Outlets in Kenya

Paula Tavrow, PhD, Deputy Director, Operations Research; Jennifer Shabahang, MHS, QA Specialist; Sammy Makama, Bungoma District Health Management Team; and Cynthia Young, MA, Senior Writer

AT least one million people die each year from malaria, the main cause of death of African children. In Kenya, about 26,000 children die annually from the disease, or about 71 each day.¹ The Bungoma District in Western Province of Kenya is a malaria endemic area. Here, malaria is the leading cause of death and accounts for 39 percent of outpatient visits, 42 percent of hospital inpatient admissions, and 36 percent of inpatient mortality.²

Research has shown that the majority of Africans seek malaria treatment from the nearest private drug outlet, such as a small shop, pharmacy, kiosk, or private clinic, rather than at more distant public clinics.³ Yet these outlets sell a wide variety of malaria drugs, including unapproved or expired medicines, often without dosage information, and in unlabeled containers. Because African governments have trouble regulating these outlets, consumers frequently purchase ineffective drugs or incorrect doses.

Since 1997, USAID has been assisting the Bungoma district to reduce malaria transmission and improve treatment practices through the African Integrated Malaria Initiative (AIMI). In 1999, the QA Project, in collaboration with the African Medical and Research Foundation (AMREF), received AIMI funds to test whether a low-cost outreach education strategy would increase private drug retailers' knowledge of and com-

pliance with Kenya's national malaria treatment guidelines.

Together with the Bungoma District Health Management Team (DHMT), the QA Project and AMREF developed a new intervention to improve private sector dispensing practices. This intervention, called "Vendor-to-Vendor Education," relied on wholesale drug vendors to communicate the new malaria guidelines to drug retailers. Wholesale drug vendors were either counter attendants from wholesale shops or pharmacies, or mobile drug vendors on motorcycles who sold drugs to small shops and kiosks.

The cornerstone of the intervention was customized shopkeeper job aids (posters) that told retailers which drugs were approved for malaria treatment, showed treatment regimens, and gave advice on how to deal with common treatment situations. Client job aids (posters) were also created, which encouraged clients to demand approved malaria drugs from the outlets. In one-day training workshops, the DHMT trained wholesale drug vendors in the new malaria guidelines. The participants learned about the new guidelines, became familiar with the new job aids, and practiced using the job aids to help explain these new guidelines to shopkeepers.

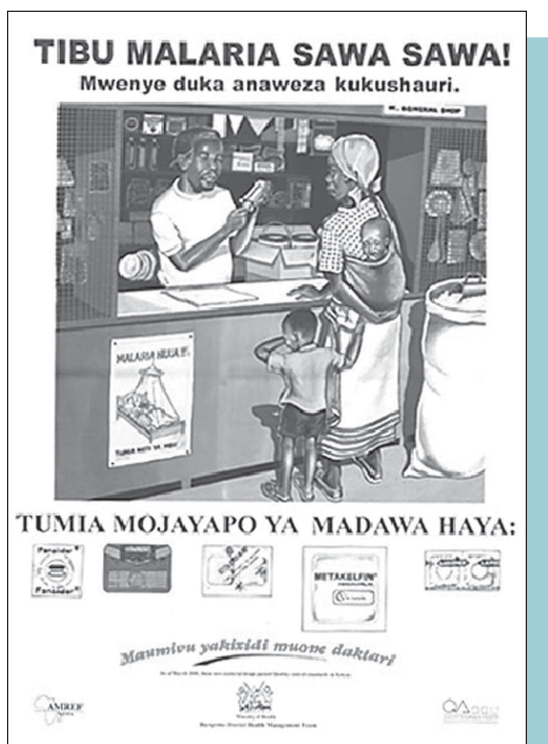
The wholesale counter attendants and mobile vendors were then asked to distribute job aid posters to shop-

¹ *Quality Assurance Project, Bungoma District Health Management Team, AMREF/Kenya. 2001. "Improving Dispensing Practices of Private Drug Outlets in Bungoma District, Kenya: Results of a Vendor-to-Vendor Education Intervention."* 5-6.

² *Ibid.*, 6.

³ McCombie, SC. 1996. "Treatment seeking for malaria: A review of recent research." *Social Science and Medicine* 43 (6): 933-45; Ruebush, TK, MK Kern, CC Campbell, AJ Oloo. 1995. "Self-treatment of malaria in a rural area of Western Kenya." *Bulletin of the World Health Organization* 73 (2): 229-36.

keepers and pharmacists from private drug outlets during their normal business transactions. This approach leveraged the drug distribution network to reach a larger number of drug sellers. In the first six months, it is estimated that about 500 outlets were reached.



To evaluate the activity, the research team employed eight mystery shoppers, who posed as a mother or father with a sick child at home. The mystery shoppers asked either for a drug recommendation or for a specific, non-approved drug. Four supervisors, who were members of the DHMT, then followed up with the outlets to check drug stocks, to inquire about the usefulness of the job aids, and to assess the shopkeepers' knowledge.

The results showed a dramatic improvement in shopkeepers' knowledge and compliance with malaria guidelines among outlets that received job aids. Mystery shoppers were nine times more likely to receive the recommended drugs from intervention outlets than from those that had not received job aids (18 versus 2 percent), and more than twice as likely to get correct dosage information (38 versus 15 percent). The research team estimated that 82,000 additional malaria clients were treated properly in the first six months due to this intervention. This activity is also affordable: it cost about \$17 per outlet reached, or \$0.10 per beneficiary.⁴

Because of these promising findings, the team recommended that Kenya's National Malaria Control Program consider rolling out the intervention to all endemic malaria areas, advise pharmaceutical companies to indicate dosages for all age groups on packaging, ensure that unapproved anti-malarial drugs do not reach the market, and address misconceptions about malaria in health education at facilities. The Kenyan government is now considering replicating the activity in one pilot district per province in 2002. The intervention may also be replicated in Uganda.

For more information, see the *Operations Research Results*, "Vendor-to-Vendor Education to Improve Malaria Treatment by Drug Outlets in Kenya" (forthcoming). To order the report, please access our website at <www.qaproject.org> or write to qapdissem@urc-chs.com.

⁴ The cost of replication in another district in Kenya would be about \$8,300.



Quality Design Reduces User Error in Malaria Test Kits

*Paula Tavrow, PhD, Deputy Director, Operations Research;
Lynne Cogswell, PhD, Consultant; and Cynthia Young, MA, Senior Writer*

MALARIA rapid diagnostic tests (MRDTs) have the potential to significantly improve the diagnosis of malaria in developing countries. Yet, for such tests to be effective, informational inserts and design of MRDT kits must be clearly understood by healthcare providers. Using quality design principles, manufacturers can introduce safer and more acceptable products that are less prone to error and waste.

Malaria is the leading cause of morbidity and mortality in eastern and southern Africa. For decades, developing countries have relied on microscopic analysis of blood smears for malaria diagnosis. Unfortunately, microscopy is time consuming, requires trained personnel and laboratory equipment, and is largely unavailable in small health facilities. Consequently, patients currently are often diagnosed and treated based solely on clinical symptoms.

MRDTs can significantly improve the diagnosis of malaria. The tests use whole blood, take only about 10 minutes, and give accurate diagnoses. However, MRDTs are not effective unless providers perform all procedures correctly, interpret results accurately, and persuade clients to take appropriate actions based on the results.

Quality design research assesses the usability of a product from the end user's viewpoint. It identifies ways to change a product and instructions to reduce

error and increase the likelihood of correct use. In 1998, the Quality Assurance (QA) Project assessed the usability of two MRDTs: PATH's Falciparum Malaria IC Strip Test and OptiMAL® Assay by FLOW, Inc. The QA Project also tested whether quality redesign of the products' instructions could improve the ability of providers to follow the steps correctly.

In a two-phase study, a research team assessed the ability of healthcare providers to use the MRDTs correctly. During the first phase, the team introduced both products to 19 providers from public health centers and mobile clinics in Malawi.

Eight received training in using the tests and 11 did not. The research team noted where users seemed to have trouble with the tests and interviewed them about the products and instructions. The team redesigned the instructions, pretested them, and then redesigned them again.

For the second phase, the team selected a new cadre of 20 providers and randomly assigned

them to one of the two products, using the redesigned instructions. None of the providers was given training.

During the first phase, just 15 percent of providers used the products without error. Among the eight providers who received training before using the MRDTs, two followed all of the steps correctly; only one in 11 untrained providers did. More than half of the providers missed more than 20 percent of the steps.

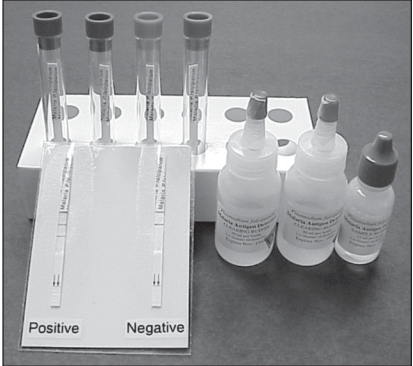
The Quality Design Approach¹

- Step 1: Set Design Objectives
- Step 2: Identify Clients and Determine Their Needs
- Step 3: Create Design
- Step 4: Test and Revise
- Step 5: Implement and Monitor

¹ These five steps can be viewed as a distillation of the QA Project's 10 Stepwise Methodology. For a more comprehensive approach to quality design that the QA Project developed after this study was completed, see the Quality Design Case Study "Designing Obstetric Services to Reduce Maternal Mortality in Guatemala."



After the instructions were revised, more than 80 percent of the providers were able to use both products without error. Both products yielded similar results.



There was no significant difference by group, and no provider missed more than 20 percent of the steps.

During the study, the researchers noted that providers encountered technical problems in using the kits—such as difficulty collecting blood, labeling speci-

mens, and lacking timing devices and lancets—that could not be rectified with improved instructional inserts. These problems would require redesign of the kits’ equipment, which was beyond the scope of the study.

This research demonstrated that dramatic performance improvements could be achieved by using the quality design approach to change the instructional inserts. Modifying the inserts to meet the providers’ needs seems to have been more effective than training providers in product use. For optimal results, changes should also be made to the equipment in the kits. The QA Project provided both MRDT manufacturers with recommendations to improve their kits before final introduction. Results of the study were also provided to the World Health Organization and the Malawi Ministry of Health.

For more information see the *Operations Research Results* report, “Using Quality Design to Improve Malaria Diagnostics Tests in Malawi.” To order the report, please access our Website at www.qaproject.org or write to qapdissem@urcchs.com.



Figure 1

Use of MRDT Kits before and after Revision of the Instructional Inserts*



* By healthcare providers who used the kits without error.



Improving Maternal and Child Health Services through COPE^{®1}

*Erin Mielke, MPH, Program Manager for Quality Improvement, EngenderHealth;
Jan Bradley, MA, Research and Evaluation Program Associate, EngenderHealth;
and Julie Becker, MSc, Program Manager, EngenderHealth*

Background

COPE stands for “client-oriented, provider-efficient services,”² and is a participatory process and set of tools for healthcare staff to continuously assess and improve the quality of their services. Based on a framework of client rights and staff needs,³ COPE tools include self-assessment guides, client interviews, client flow analysis, and an action plan. Since it was developed for family planning services in 1988, COPE has been used in more than 35 countries, translated into 15 languages, and adapted for a variety of health services, including maternal and child health.

COPE for Maternal Health Services

COPE for Maternal Health services was first adapted in 1997 by EngenderHealth in collaboration with the Ministry of Health (MOH) of Kenya. EngenderHealth, formerly AVSC International, provides technical assistance to reproductive health programs in more than 30 countries. The self-assessment guides were adapted to reflect service standards and guidelines from the World Health Organization (WHO), the Safe Motherhood Initiative, and Family Care International. In 1998, a pilot test of the guides in 13 sites in East Africa produced the results in Table 1.⁴

Client Perspectives

Interviews with clients demonstrated their appreciation of the improvements made.

“I have been to various [healthcare facilities], but this is one among the few that is actually improving.” –
Mother who chose to deliver her baby at the hospital.

COPE for Maternal Care has been revised in 2001 to reflect new evidence and changes in standards over the last two years. The self-assessment guides cover the following services: antenatal care; routine labor and delivery; emergency obstetric care, including post-abortion care and postpartum care, both immediate and follow-up.

COPE for Child Health Services

In 1998, EngenderHealth, with support from the U.S. Agency for International Development (USAID) Africa Bureau, adapted the COPE tools for child health and developed a quasi-experimental evaluation of the impact of COPE on child health services. Agencies collaborating in the adaptation and evaluation design included UNICEF, SARA, MEASURE, BASICS, and WHO. Implementation and evaluation followed in collaboration with the MOH and UNICEF in Kenya and Guinea.

¹ COPE[®] is a registered trademark.

² AVSC International. 1995. COPE: Client-oriented, provider-efficient services. New York: AVSC International.

³ C. Huezo and S. Diaz. 1993. *Quality of care in family planning: Clients' rights and providers' needs*. Advances in Contraception. 9:129-39.

⁴ *Refinement and publication of the COPE for Maternal Care self-assessment guides are underway through collaboration between EngenderHealth and Family Care International.*



Table 1

Examples of Pilot Test Solutions Implemented

Problem	Solution
Lack of information given to antenatal clients (nutrition, what to expect during labor and delivery, Cesarean sections).	Staff were updated and are now giving information in the antenatal clinic on labor, delivery, and breastfeeding; staff plan to print brochures.
Overcrowding in the maternity ward due to shortage of staff in the ward, resulting in one staff member handling more than one delivery at a time.	Reduced absenteeism by doctors on call in the labor ward and operating theater; clinicians review patients more frequently and then discharge those who are ready to leave.
Severe shortage of delivery packs in a site with an average of 80 deliveries in 24 hours.	Staff procured an additional 42 delivery packs.
Shortage of linens in the maternity wards (not enough gowns for patients); and linens not being decontaminated in wards before being taken to the laundry because ward decontaminating buckets had no lids and chlorine solution was evaporating.	Purchased lids for buckets so that chlorine solution no longer evaporates; proper concentration of chlorine solution ensures that gowns are not disintegrating as quickly as they were before.
Lack of equipment and supplies (working autoclave, gloves, chlorine).	Autoclave machine repaired.

Self-assessment guide questions were adapted to broadly address child health, and to reflect the Integrated Management of Childhood Illness (IMCI) approach.⁵ The questions are designed to communicate standards of care and serve as a support to the IMCI approach, but can be used equally in facilities that are not applying the IMCI approach. The record review tool (part of the self-assessment guide to safe services) was developed for use only in sites where IMCI has been implemented and standard records are kept. The client interview tool was revised so that the parent or caretaker of the child is interviewed, although the child is equally considered a client.

Evaluation Design and Preliminary Results

The COPE for Child Health evaluation involves four

intervention and four non-intervention sites in both Kenya and Guinea. Pre- and post-surveys were conducted, including a facility audit, provider interviews, client exit interviews, and observations of client-provider interactions. Throughout the two years, health service statistics on sickness, immunizations, and antenatal care were collected. Preliminary qualitative findings of sample problems and solutions from the initial implementation are presented in Table 2. Final evaluation results will be forthcoming in early 2002.

Staff Perspectives

Focus groups and interviews with site staff revealed their enthusiasm for the sense of teamwork, empowerment, and concern for their clients brought about through COPE.

⁵ AVSC International. 1999. COPE for Child Health: A Process and Tools for Improving the Quality of Child Health Services, Draft. New York: AVSC International.



Table 2

Examples of Solutions Implemented

Problem	Solution
One health center was closing earlier than it should have, and waiting clients were not served after closing.	Staff agreed to respect normal working hours. A new work schedule was made to ensure providers' availability after 3 p.m.
Delays for EPI clients, since sterilization of EPI materials was being done at the beginning of each day.	Staff began sterilizing materials at the end of the day so that services could begin at the clinic opening each morning.
Some staff could not provide proper information to clients on the management of sick children.	Staff organized updates for their coworkers. For areas where no staff were adequately informed, staff asked the prefecture for help with training, which was provided.
High immunization dropout rates due to poor record keeping. Staff could not identify those needing follow-up.	Improved recording of immunization history; resolved stock-outs of child health cards.
Pregnant women not given malaria prophylaxis because providers did not know MOH guidelines.	Staff informed of MOH policies. Poster on malaria prophylaxis put up in antenatal clinic room. Staff began offering prophylaxis.
Indigent patients not coming to the clinics because local funds under Bamako Initiative were not being designated for indigent care. Staff lacked clear guidelines about which patients are considered indigent and how to ask about their financial situation in a confidential manner.	Health center staff and the health center management committee established new criteria and implemented them at the facility. Involvement of members of the local Bamako health center management committees in the COPE process made the solution easier to accomplish.

“Before [COPE], I came to work as part of a daily routine; now I come to work because I feel that my work is important.” – *President of the COPE Committee in Labe, Guinea*


“[The COPE process] has generated some life in us. Before, problems were someone else’s responsibility. But now we see that we ourselves can solve most of the problems. COPE Child Health makes people see more broadly their responsibilities.” – *District MOH administrator/head of health center, Kenya*

“COPE Child Health has made us see patients as individual persons... [The service provider is] supposed to work for patients. [To do this] we should try to understand the minds of patients and they should be free to express themselves.” – *Nurse, Kenya*

Conclusions

Survey results from nonparticipant observation and further client interviews will provide a more objective view of the changes in services that have resulted. Meanwhile, interim results from informal interviews and discussions with staff show that they have embraced COPE, the process has raised their morale, and they are finding practical solutions to important problems.





CaliRed: A Performance and Quality Improvement Model for Maternal and Neonatal Health Services Network in Guatemala

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and Oscar Cordon, MD, MPH, Country Representative for Guatemala, JHPIEGO Corporation

THE Maternal and Neonatal Health Program (MNH) is working in collaboration with the Guatemalan Ministry of Health (MOH) to implement a Performance and Quality Improvement (PQI) model in maternal and neonatal health, named CaliRed, in the departments of San Marcos, Quiché, Sololá, Suchitepequez, Totonicapán, Quetzaltenango, and Retalhuleu. The PQI model aims to improve the quality of the maternal and neonatal services network, increase the demand for and use of health facilities by women during pregnancy, labor, delivery, and postpartum periods, and foster household and community participation in addressing problems related to maternal and neonatal health through community mobilization efforts.

In 2000, The MNH Program provided technical assistance to the MOH to develop an assessment tool including “operational standards” to assess the quality of the maternal and neonatal health services in an objective, rapid, and practical way. The assessment tools include standards to define desired performance for maternal and neonatal health services and related support functions in health facilities. These tools also serve to measure current performance and identify gaps that require improvements. The steps for the development of the assessment tool were:

- Identification of the basic functions/services by type of health facility, based on national policies and priorities

- Determination of key (sentinel) standards and indicators (structure, process, and outcomes) based on the national norms and using the WHO Managing Complications of Pregnancy and Childbirth/Integrated Management of Pregnancy and Childbirth Manual as a reference
- Incorporation of provider inputs and perspectives
- Incorporation of client needs and expectations through participatory techniques and interviews with key community representatives and client feedback. The identification of clients’ perceptions and needs begins early on in the process and continuously provides critical input for the development of the tools

The CaliRed assessment tools were developed by each type of health facility, including health posts, health centers without beds, health centers with beds/community maternities, and district hospitals, and include the following areas:

- Clinical services (antenatal care, normal delivery, postpartum and neonatal care, complications)
- Infection prevention
- Support services (laboratory, blood bank, pharmacy)
- IEC and demand promotion
- Human resources, equipment and supplies (including logistics), and physical plant
- Management systems



Starting in March 2001, a baseline was conducted using the assessment tools in seven hospitals, 10 health centers, and 23 health posts in the seven departments in which the MNH Program is working. The baseline was conducted by Quality Improvement Support Teams (QIST), formed by technical and supervisory staff of the MOH central, departmental, and local levels, and representatives of NGOs working in the same geographical area, including CARE, Project Hope, and the local NGOs Arenys Solidari and Vivamos Mejor.

Prior to conducting the baseline, the QIST received training which covered the concepts, process, and tools of the PQI model, and included skills development for promoting and supporting the change process (vision and leadership, team building and teamwork, motivation, change management, and resource mobilization).

The results of the baseline are as follows: hospitals achieved an average of 13 of 77 criteria (11%), health centers eight of 58 criteria (14%), and health posts seven of 44 criteria (15%). Despite the significant gaps identified, all of the health facilities that participated in the baseline felt motivated to participate in the CaliRed process and are eager to improve quality of care at their health facilities.

Led by the QIST, local Quality Improvement teams were organized, grouped by the different areas of the assessment tool, in order to promote and implement the necessary changes and interventions. Each group analyzes the gap in the area under its responsibility and begins to implement changes immediately, beginning with the simplest and easiest things. The underlying idea is that rapid action produces quick results that create momentum for change and increase the staff's sense of empowerment and motivation.

Some of the gaps identified require more structured or complex interventions, particularly when new technical procedures based on scientific evidence are being introduced. Examples of this type of intervention

include: the implementation of the WHO partogram and the CLAP perinatal clinical history; incorporation of new clinical practices such as the active management of the third stage of labor and the restricted use of episiotomy; closer observation during the immediate postpartum period (two hours); routine decontamination of medical instruments using a dilute bleach solution; incorporation of puncture-proof containers for sharps disposal; increased hand-washing; and the adoption of culturally appropriate measures to attract clients, such as the incorporation of traditional birth attendants in hospital-based maternal care.

Some of these interventions have required training (competency-based clinical training has been conducted in the Coatepeque and Malacatán hospitals). Other interventions have necessitated organizational improvements. Most efforts to improve performance and quality have involved a combination of training, organizational improvements, and reinforcement of provider motivation.

The next external assessment is scheduled for February and March 2002, and significant improvements are expected based on observed progress to date. The PQI process will lead to the accreditation of the facilities that achieve a high level of compliance with the quality standards.

Simultaneous to the PQI process, community level activities are being implemented by the MNH Program in Guatemala. Community mobilization strategies are now underway in 30 communities in the priority departments (El Quiché, Sololá, and San Marcos). Community activities aim to enable women, their families, and their communities to identify and act on maternal and neonatal health danger signals, provide support for the rapid access of women and newborns to appropriate health services, and improve the relationship between communities and health facilities.





Applying Modern Quality Improvement Methodology to Maternal and Child Health in Tver Oblast, Russian Federation

M. Rashad F. Massoud, MD, MPH, Associate QA Project Director, Russia, NIS, Asia, and the Middle East

THIS article demonstrates the application of quality assurance methodology in maternal and child health (MCH) in the Russian Federation. It describes the integration of content and improvement knowledge to achieve better outcomes in a clinical system of care.

In 1998, the Quality Assurance (QA) Project was invited to collaborate with our Russian counterparts on developing demonstration projects in the use of modern quality improvement methods in the Russian Federation. It was suggested that one of the two demonstration projects be to improve MCH in Tver Oblast,¹ a region north of Moscow.

The quality improvement methodology, which was used to make improvements in MCH, consists of the four steps shown in Figure 1.

Identify

A planning meeting was convened in Tver Oblast, to choose priority conditions within MCH for the demonstration project. Participants included the leadership of the department of health, maternal and child health services, representatives of Tver State Medical Academy, and representatives of physicians directly involved in the delivery of services. The participants reviewed and discussed the epidemiological data and service statistics for MCH in Tver Oblast. As a result, the participants chose to improve care for women suffering from pregnancy-induced hypertension (PIH)

as their maternal health priority. PIH accounted for seven of the 25 maternal deaths in the preceding three years. In addition, PIH is one of the diseases physicians were having the greatest difficulty managing. Similarly, for child health, participants agreed to focus on improving care for neonates suffering from respiratory distress syndrome (RDS), as, in 1997, it accounted for 66.7 percent of early neonatal mortality.

Project organization was also discussed at the planning meeting. Participants included three hospitals representing the different levels of care, and the urban and rural distribution in the system involved in PIH care in designing the demonstration. In designing the demonstration for RDS, the participants included five hospitals representing the different levels of care, as well as the urban and rural distribution in the system involved in neonatal RDS care. Teams were set up in each of the participating facilities. Each team had a leader and included representatives from the different professional functions involved in the systems of care for PIH and RDS.

Analyze

Members of the PIH and RDS teams were trained in the quality improvement methodology. Following which, they proceeded to analyze the current systems of PIH and RDS care in their own facilities, as well as referrals and interactions with other facilities in the system. As part of this step, they created flowcharts

¹ Tver Oblast is one of the 89 subjects of the Russian Federation. Oblasts are administrative regions and have local governments called governorates. The health system in the Russian Federation has been decentralized to this oblast level. Tver Oblast is located to the north of Moscow en route to St. Petersburg and has a population of 1.6 million.

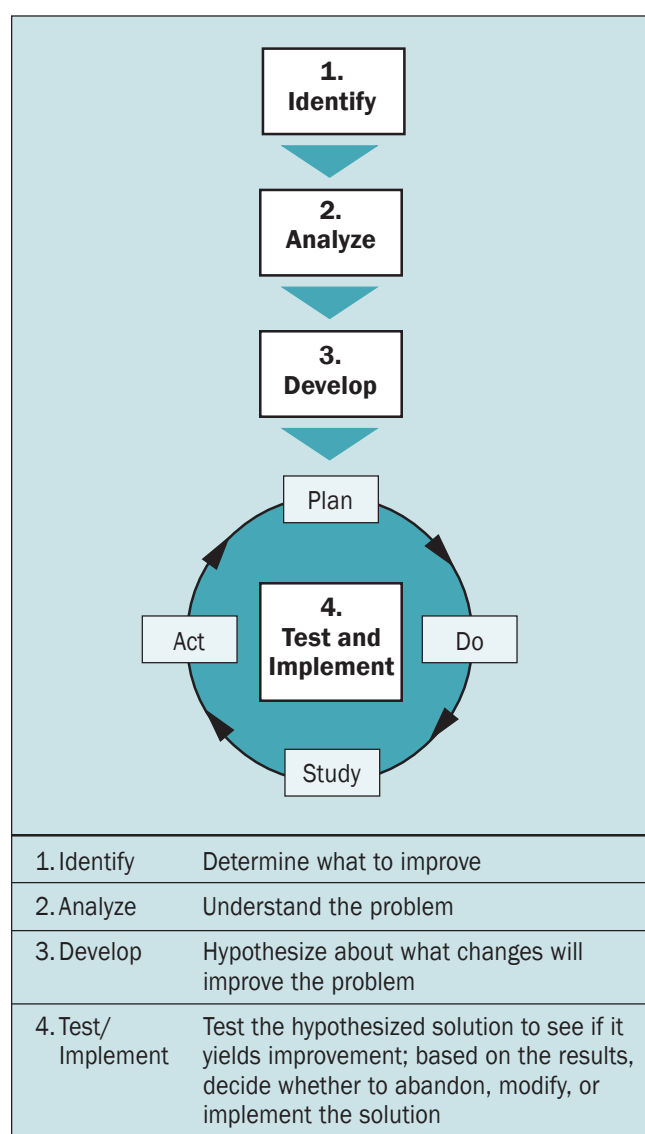
showing how care was provided to women suffering from PIH and to newborns suffering from RDS. These flowcharts showed how care was organized. The teams examined each step in the organization of care and noted what clinical content was provided at each of these steps. This clinical content included diagnostic criteria, referral criteria, medications administered, procedures conducted and their indications, among others. This work resulted in a deeper understanding of the existing systems of care both from the organizational and the clinical perspectives. It was evident from the analysis that both PIH and RDS care were not standardized across the different facilities. There were many points at which team members could not agree on steps in the process or on relevant clinical content. For RDS, it was also evident that the facilities were poorly equipped and staffed. At this stage, the team also developed the first set of quality indicators for the systems of PIH and RDS care.

Develop

Team members received training and up-to-date evidence-based literature on PIH and RDS. They reviewed their current clinical practices in this light and made decisions on changes and standardization needed in their clinical practices. Then, they reviewed the ways that care is organized, to decide what changes they needed to make in organizing care to facilitate implementation of the updated clinical practices. As a result, the teams developed new clinical and organizational guidelines for PIH and RDS.²

The new system of PIH care differed fundamentally from the old one: teams adopted the 10th International Classification of Diseases (ICD-10), which is different from the Russian classification and meant that far fewer women are diagnosed with PIH. For those diagnosed with PIH, eclampsia is prevented through the

Figure 1
Four Steps to Quality Improvement



use of intravenous magnesium sulfate and the pregnant women are prepared for early delivery. The organization of care was also re-designed. The new system

² *Improving Care for Women Suffering from Pregnancy-Induced Hypertension, Russian Federation – United States of America, 2001.* Published by the Quality Assurance Project. Available in English and in Russian.



Results

The most recent data (28 months, for the 3 pilot hospitals, number of deliveries 6108), which has been collected from January 1998 – April 2001 and analyzed, shows the following: No deaths or progression to eclampsia in patients managed in the 3 pilot hospitals since the new system was implemented. Additionally, there was a significant and sustained decrease in hospitalizations due to PIH as shown in Figure 2.

Figure 2

Percentage of Women Hospitalized This Month Because of PIH of the Number of Women with PIH Who Delivered This Month

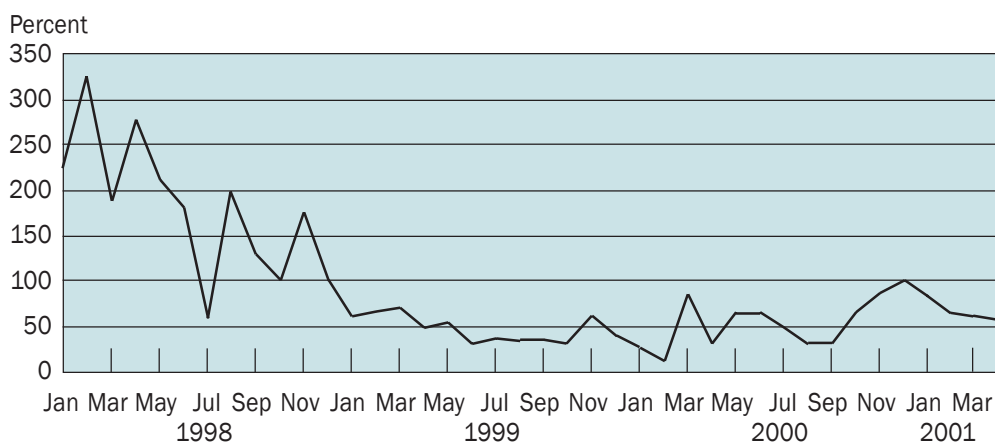


Figure 3

PIH as a Percentage of All Deliveries

A continued reduction in the incorrect diagnosis of PIH for the 3 hospitals involved in the pilot phase. Since the physicians from pilot phase became trainers for the rest of the organizations in the scale-up, there has been a further reduction in their incorrect diagnosis of PIH.

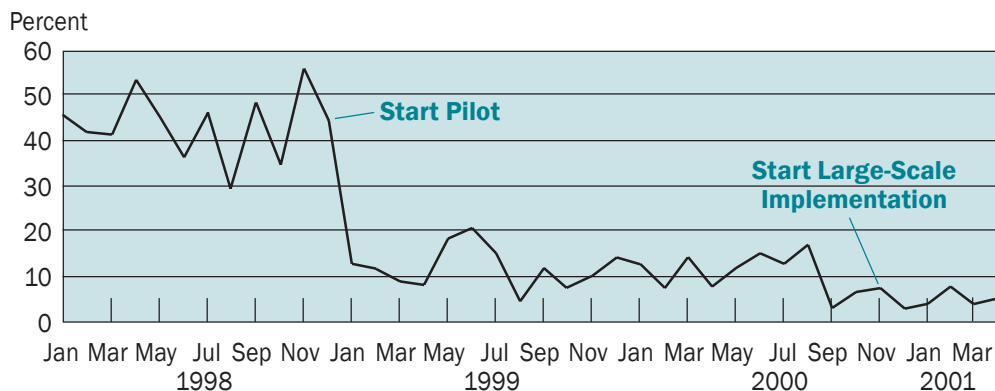


Figure 4

Proportion of Women with Eclampsia Who Delivered This Month

The beginnings of a reduction in the incidence of eclampsia throughout the 42 hospitals in Tver Oblast is seen in Figure 4.

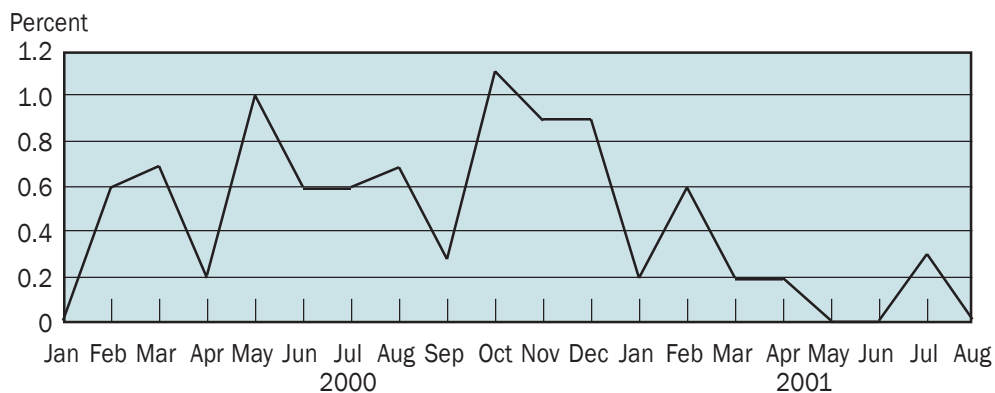
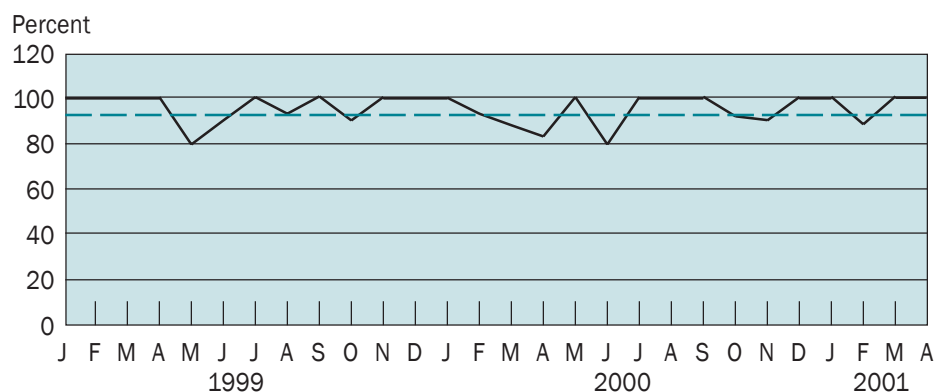




Figure 5

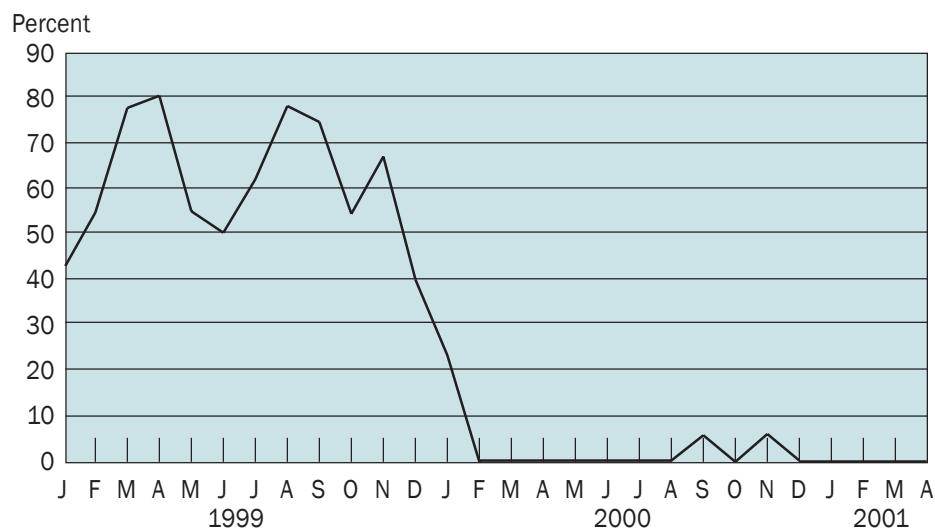
Percentage of Neonates With RDS Who Lived at Least Until the 7th Day after Initial Resuscitation



The '7-day after initial resuscitation' survival rate is 93%.

Figure 6

Percentage of Newborns Transported to NICU Who Had a Body Temperature Not within 36.5-37.2 Degrees Celsius



A very significant and sustained decrease in hypothermia occurred in newborns transported to the NICU.

of Neonatal Respiratory Distress Syndrome (NRDS) care comprised three components: a central referral neonatal intensive care unit, equipped for NRDS, neonatal resuscitation at the other facilities, and a neonatal transportation system between the facilities. At this stage, the teams also reviewed the indicators to ensure that they were capable of measuring the effects of the changes introduced to the PIH and RDS care systems.

Test and Implement

The new PIH and RDS care systems were phased in gradually. This was achieved through careful planning of the introduction of the changes, testing all the different components to see whether they yielded improvement, counteracting any errors that arose, and ensuring that the new system functioned as intended.



Based on the success of the demonstration in improving these systems of PIH and RDS care, the participants decided to disseminate it throughout Tver Oblast. To accomplish this, the QA Project is currently collaborating with its Russian counterparts on developing a model for the large-scale implementation of successful pilots. This model adapts ideas and frameworks from quality improvement and diffusion of innovations³ to the Russian organizational culture. These PIH and RDS improvements, originally developed in three and five hospitals, respectively, are being disseminated to all 42 hospitals throughout Tver Oblast.

Acknowledgements:

This work represents the efforts of many professionals and organizations. The Russian counterparts include: the Department of Health, Tver Oblast: Director of

Health, Dr. Alexander Zlobin; Chief of MCH, Dr. Lidia Samoshkina; Chief of Ob-GYN, Dr. Tatiana Gviniashvilli; Chief of Neonatology, Dr. Tatiana Dimitreva; QAP Project Director, Tver Oblast, Dr. Olga Chernobrovkina; The Central Public Health Research Institute in Moscow, Chief of the Methodological Center for Quality Assurance, Dr. Anna Korotkova. QAP/Russia MCH consultants: Professor Patrick Nugent, Pauline Glatleider, Dr. Sudahkar Ezhuthachan, and Christine Newman. Several members of the QA Project in Bethesda, Maryland, also were involved, including Associate QA Project Director for Russia, NIS, Asia, and the Middle East, Dr. M. Rashad Massoud, who led the project.



³ Everett M. Rogers, *Diffusion of Innovations, 4th Edition, Free Press, 1995.*



Team-Based Problem-Solving Improves Coverage of Essential Prenatal Care Services in Rwanda

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THE N'zigé Health Center in rural Rwanda serves a population of 24,000 inhabitants. Census projections estimate that 1,119 pregnancies should be expected per year in this population. Two nurses, out of a staff of 10, were trained in a systematic problem-solving method by the Quality Assurance Project and started a team to address quality of care issues.

Identifying the Opportunity for Improvement

Health center staff selected the low attendance rate for prenatal care services in the first trimester as their priority issue. In the first seven months of 2000, out of 509 prenatal care (PNC) visits, only seven (1.4 percent) took place during the first trimester of pregnancy. Initially, the team aimed to increase the coverage rate of first trimester visits.

Analyzing the Issue and System of Care

When the team analyzed the issue, it ended up with an unclear flowchart of the PNC processes, as well as staff, population, and system-related potential root causes that needed to be further explored. The clinic team then conducted a survey of 60 women attending clinical care services. The traditional birth attendants visited 40 women at home. The in-charge nurse evaluated the performance of PNC services providers against the Ministry of Health standards on a sample of 10 clients. This data collection provided the following information:

- Eighty percent of women misunderstood the benefit of antenatal consultation during the first quarter of pregnancy
- Of 10 patients: one was greeted by the health worker, none had their health cards checked, none was screened for vaccination status, three were referred for vaccination, five were examined for pre-tibial edema, one received routine lab tests, five received iron prescriptions, none received adequate counseling
- Clients complained that the waiting time for prenatal care consultations was too long

Developing and Implementing Solutions

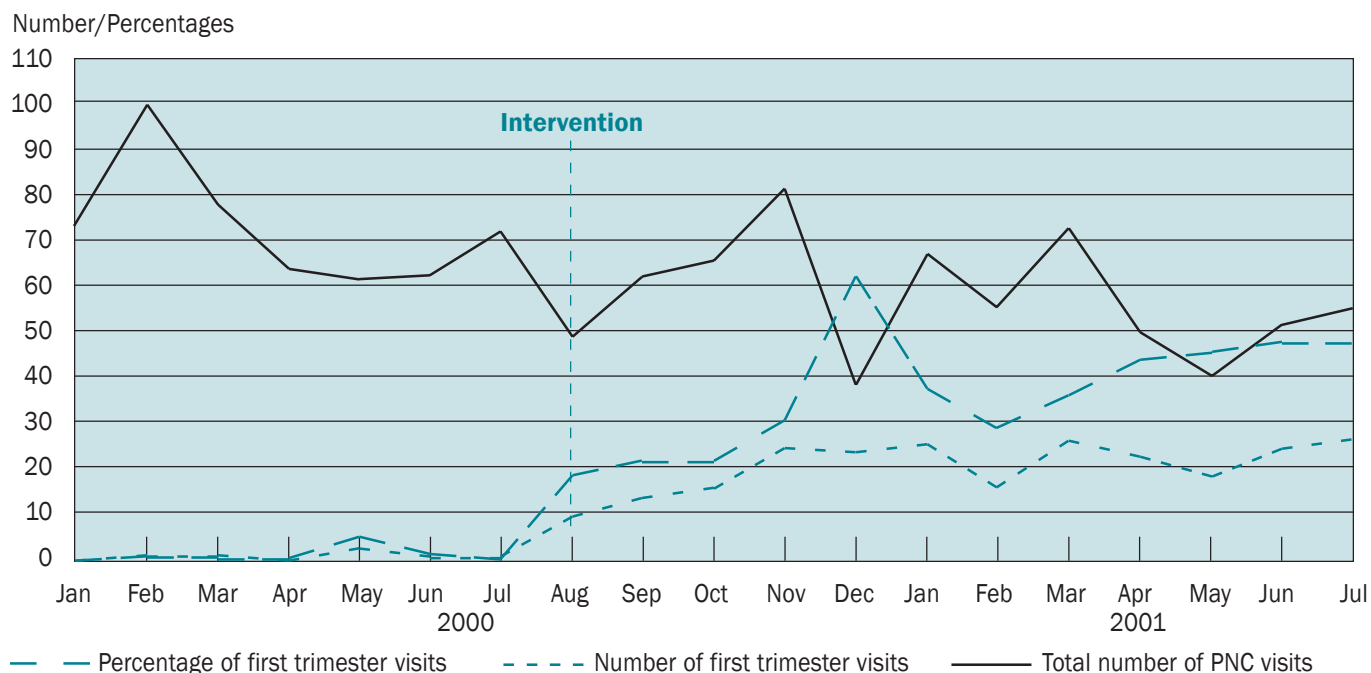
Based on their analysis of the system of care, the team developed and implemented four different solutions or interventions:

1. Sensitizing diverse groups on the importance of PNC during the first trimester: clients, community representatives, traditional midwives, community health promoters, and community members
2. Training staff on antenatal consultation standards
3. Changing the PNC process to include systematic clinical assessment for all clients, systematic lab tests at each visit, and immediate care for clients upon arrival
4. Doubling the number of staff assigned to the PNC clinic to three or four individuals



Figure 1

Trends in Timely Utilization of PNC Visits



Results

Initial implementation of the solutions started in August 2000. Soon after, the number of first trimester PNC visits increased from an average of one per month (before the interventions) to an average of 21 per month over the following 11 months. However, during this interval, without any obvious explanation, the average monthly number of PNC visits decreased slightly from 73 before the interventions to 58 after.

As a result, the monthly average of the proportion of first-trimester visits among all PNC visits increased from 1.5 percent (January–July 2000) to 36 percent (August 2000–July 2001). Figure 1 illustrates the impact of the interventions tried. In addition, the team estimated that waiting time had been reduced from three to four hours to 30 minutes to one hour. The team did not monitor changes in providers' performance.

Lessons Learned

- A simple QA method created a team dynamic which enabled them to recognize and address multiple quality issues that had been neglected for a long time: utilization rate of essential services, staff performance, and client satisfaction
- Including community members in the team efforts facilitated the implementation of community education and sensitization sessions
- The quality and frequency of QA technical assistance to facility teams, especially during the early phase of their improvement efforts, contributed to their success and was particularly important in the development and implementation especially in setting a good performance monitoring system.





Improving the Quality of Essential Obstetric Care in Bolivia

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Quality Improvement Methodology

The LAMM Initiative is being carried out in local demonstration sites in three countries: Bolivia, Ecuador, and Honduras. This article describes experiences, methods used, and some illustrative results obtained in the quality improvement component of the initiative in the district of Ichilo, Bolivia.

The quality improvement (QI) effort began in March 2000 in Ichilo district, department of Santa Cruz, Bolivia. The Ichilo district has three hospitals and one health center. Several approaches were used to improve the quality of essential obstetric care (EOC): (a) clinical training in EOC for doctors, nurses, and auxiliary nurses of every facility in the district, (b) development and communications of EOC standards through problem-based learning, (c) EOC process improvement through quality improvement teams formed in each hospital, (d) a system for ensuring availability of essential EOC drugs and supplies, and (e) monthly monitoring and discussion of EOC quality and coverage indicators.

Quality improvement teams were implemented with the specific objective of monitoring and improving compliance with clinical and administrative standards. This emphasis on compliance with standards aimed to reinforce the clinical skills training in EOC provided by LAMM for nearly 100 percent of the healthcare providers in the district of Ichilo. The quality improvement teams focused on improving processes for prenatal care and labor and delivery and began by agreeing upon key standards of care. These standards actually represented the greatest challenge to compliance from the providers.

The Latin American Maternal Mortality Initiative (LAMM) is a partnership funded by the U.S. Agency for International Development (USAID) and implemented by the Quality Assurance (QA) Project and the Pan American Health Organization (PAHO), with a threefold approach to reducing maternal mortality:

- **Build advocacy for the reduction of maternal mortality through policy and dialogue.** PAHO promotes policies ensuring that access to and quality of Essential Obstetrical Care (EOC) services help to build a policy environment in which the reduction of maternal mortality is a priority.
- **Improve the quality of EOC services.** Many women die from unpredicted complications, sometimes necessitating (and despite) prompt and emergency treatment. The QA Project improves the delivery of basic EOC at the first level of care and comprehensive EOC at referral hospitals by strengthening clinical EOC skills and re-designing and improving key EOC services.
- **Mobilize communities to access services provided by trained attendants.** The QA Project subcontracts nongovernmental organizations (NGOs) to work at the community level to improve the recognition of danger signs and complications, particularly during the intrapartum and immediate postpartum periods when most serious complications occur, and to access 24-hour quality EOC services.



Next, the teams developed indicators to measure compliance with those standards. Using the indicators' results to prioritize the needs, the quality improvement teams applied the QA Project's four-step quality improvement methodology: (1) identify the problem, (2) analyze the problem, (3) develop solutions, and (4) test and implement solutions. The activities carried out during each of these steps are discussed in the sections that follow.

The team applied the Rapid Team Problem-Solving approach. They developed a series of small incremental changes, then tested and implemented them in the system. This approach to quality improvement is considered "rapid" because it is used when team members have insight into the causes of and potential solutions to the problem—thereby minimizing extensive data collection. For example, the teams in Ichilo began to achieve results as soon as one to two months after initiating the quality improvement process. It is important to note, however, that these quality improvement teams were able to apply Rapid Team Problem-Solving because they received on-going support and guidance from facilitators from LAMM and Ministry of Health district and provincial supervisors.

Table 1 illustrates the first step of the QI methodology, choosing key standards of care and the corresponding solutions proposed by the teams.

Results of the Quality Improvement Teams

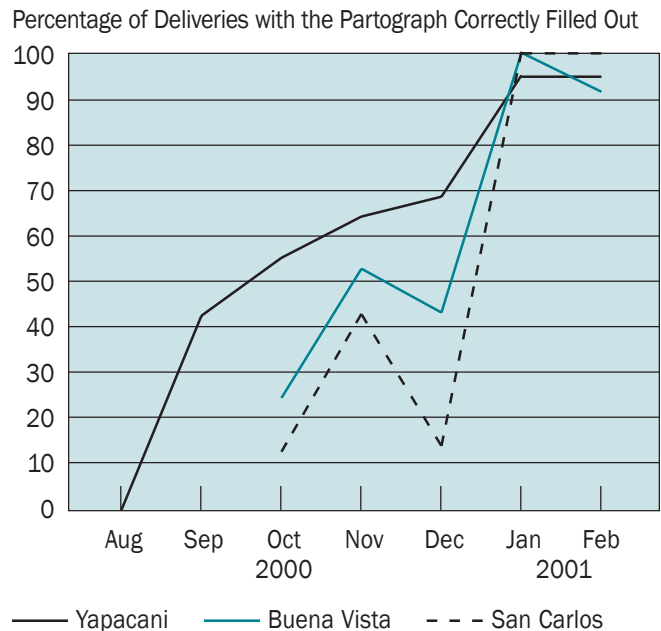
Compliance with EOC standards has greatly improved in Ichilo district in a relatively short time. The teams monitored the impact of their interventions and began to see dramatic improvements within a couple of months.

- The QI teams achieved great improvements in laboratory assessment during labor, climbing from 33 to 88 percent in Yapacani, from 83 to 100 percent in Buena Vista, and from 7 to 80 percent in San Carlos.

- The correct use of the partograph increased from 0 to 95 percent in Yapacani Hospital and from 24 to 92 percent in Buena Vista Hospital; San Carlos Hospital has achieved 100 percent compliance with this standard two months in a row (see Figure 1).

Figure 1

Improvement in the Correct Use of the Partograph



- Buena Vista and Yapacani Hospitals achieved 100 percent compliance with postpartum monitoring for two months in a row, while San Carlos Hospital reached 92 percent compliance with this standard. A recording form developed by the QI team in Yapacani to systematize and record the monitoring of women during the first two hours after delivery is now being implemented in health facilities throughout the district.
- The QI teams in Yapacani and Buena Vista hospitals chose to improve the accurate and thorough



Table 1

Illustrative List of Clinical Standards and Proposed Solutions from Quality Improvement Teams in Ichilo, Bolivia

Clinical Standard	Changes Proposed or Implemented
Every woman during pregnancy should receive the tetanus toxoid vaccine two times	<ul style="list-style-type: none">■ Train personnel in the importance and administration of the tetanus toxoid vaccine■ Establish a mechanism to record the administration of the tetanus toxoid vaccine■ Implement an inventory system to always have at least 20 needles and sufficient supplies of the tetanus toxoid on stock
Every woman who has antenatal control at this hospital should receive iron tablets, according to gestational age and norms	<ul style="list-style-type: none">■ Communicate to staff the importance of iron sulfate supplements during prenatal care■ Establish accountability for the administration of iron sulfate supplements■ Record the administration of iron sulfate supplements on the perinatal record
Every mother at delivery will have results of recently performed lab tests: hemoglobin, blood group, Rh factor, syphilis	<ul style="list-style-type: none">■ Inform personnel that laboratory tests for women in labor and delivery are a standard of care■ Hold a half-day practical training in conducting laboratory exams
In every delivery, a perinatal clinical record should be completed	<ul style="list-style-type: none">■ Communicate to staff the importance of the perinatal form■ Organize rapid training sessions on how to complete the form properly■ Provide forms permanently, avoiding stock-outs of paper
Every delivery at the hospital will be monitored through the use of the partograph	<ul style="list-style-type: none">■ A one-day reinforcement course will be provided for all nurses and physicians
During the first two hours after every delivery, the mother will be examined every 30 minutes, checking for standardized tasks: vital signs, bleeding, and uterine status	<ul style="list-style-type: none">■ Create a rotation staff schedule so that staff are always present to monitor these key areas■ Train staff in the monitoring of postpartum patients■ Create a reporting system to include immediate postpartum monitoring in the clinical record

completion of the perinatal clinical record during pregnancy, delivery, and the postpartum period. The completion of the perinatal clinical record has improved in Yapacani hospital from 15 percent (August 2000) to 98 percent (February 2001). Buena Vista hospital improved its performance from 24 percent (October 2000) to 92 percent (February 2001).

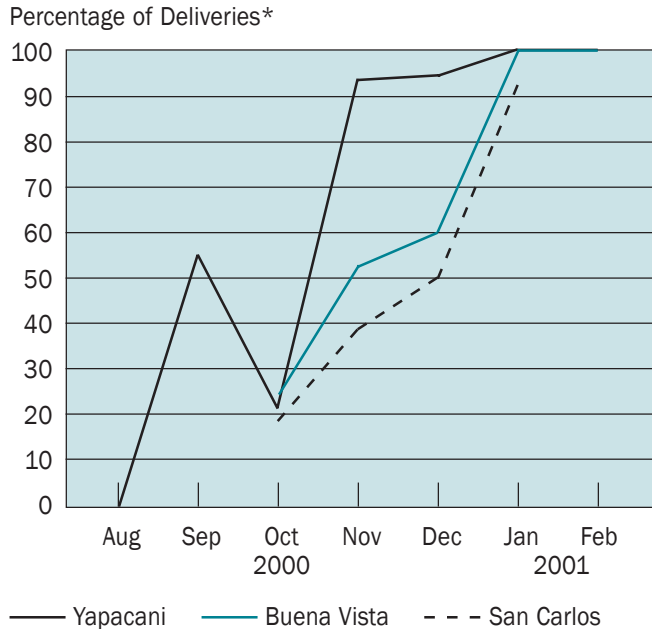
- The QI team in Buena Vista established standards to personalize labor and delivery for clients by allowing women to choose their position during

delivery and permitting a family member to accompany her during delivery. The effects of these changes is illustrated by an example of a woman who decided to deliver her seventh child in Buena Vista hospital instead of at home, where her other children had been delivered by a traditional birth attendant. She chose Buena Vista hospital because she heard that she could choose her position and remain with her husband during delivery.



Figure 2

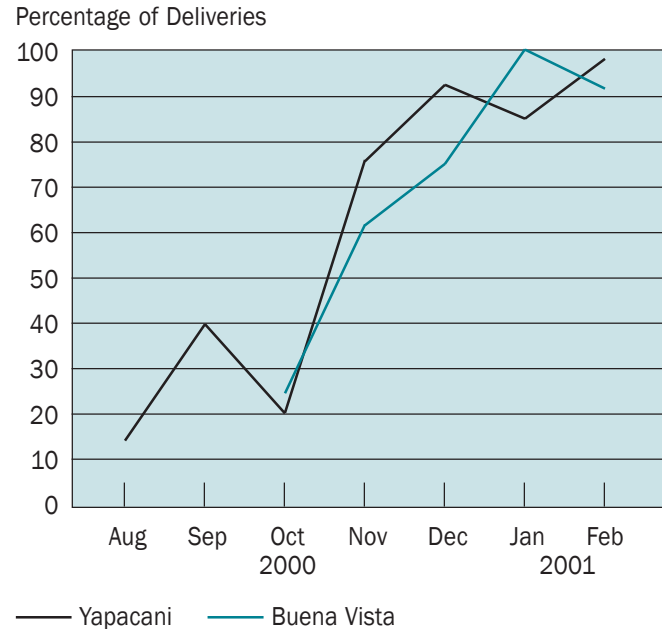
Deliveries Where Standard Clinical Care Was Performed



* In which standard clinical care was performed in the first two hours after delivery

Figure 3

Deliveries with Complete Standard Perinatal Clinical Record



Conclusion

The use of the quality improvement methodology to improve compliance with clinical and administrative standards proved to be so successful in Ichilo, Bolivia, that in 2001 the QA Project initiated the application of this methodology in Honduras and Ecuador. In Honduras in May 2001, eight quality improvement teams were formed throughout the Comayagua region to improve compliance with standards for obstetrical

complications, labor monitoring, prenatal care, administration, medical registers, regional statistics for EOC, human resources, and neonatal care.

In Ecuador, quality improvement teams have been formed and are active in the hospitals of Latacunga, Salcedo and Pujili, in the province of Cotopaxi.





Quality Assurance and Performance Improvement: A Perspective from the PRIME II Project

*Marc Luoma, PRIME II Director of Performance Improvement;
William H. Jansen II, PhD, PRIME II Project Executive Director;
and James McCaffery, PhD, Project Leadership Group, PRIME II Project*

Editor's Note:

The previous issue of the QA Brief presented an article titled "Quality Assurance and Performance Improvement" by Thada Bornstein. We are pleased to publish a perspective on that article, by staff of the PRIME II Project, which compares quality assurance/quality improvement (QA/QI) and performance improvement (PI).

WE read with interest the Spring 2001 issue of *QA Brief*, which framed a comparison of the quality assurance (QA) and performance improvement (PI) approaches. We applaud the effort to identify the similar and distinguishing features of the two. It is important for our colleagues in the fields of international and reproductive health to understand how and when each approach can be used to its full potential.

We would like to add our views on how PI is currently practiced in the field, especially by the PRIME II Project. In doing so, we hope to give the readership of the *QA Brief* additional views of PI so that they can be aware of the full potential that PI represents.

Focus

The opening editorial of the issue states that "PI begins with a focus on the limitations of staff training..." Our PI work, which is consistent with the framework adopted by the PI Consultative Group, begins with the identification of desired performance and its impact. The focus from the beginning is on the results that should be achieved.

Sustainability

The earlier *QA Brief* article states that "PI is usually led by a specialized practitioner while QA and QI have always been intended to be managed by the

health program itself." This statement, and the discussion following, could lead the reader to conclude that the PI approach is less likely to be sustained or continue to have an impact in the healthcare settings where it is applied. Sustainability in PI is a planned outcome of PRIME II work. In fact, both approaches use facilitation to move the process along. In the course of implementing a variety of PI initiatives in the PRIME II Project, we have found that field staff can and do learn the PI process quickly. We also see that healthcare organizations do continue to use the PI approach and its tools after the completion of external technical assistance. Our experience indicates that by making capacity building a specific part of any technical assistance in PI, the ability to build a "leave-behind" capability in PI is greatly enhanced.

Teamwork

Another statement indicates that QA "contrasts with PI, which does not emphasize the use of teams." In the way that the PI approach is practiced in the PRIME II Project, the formalized stakeholder buy-in process demands the participation of rather large teams. Indeed, wide participation in defining desired performance and conducting cause analyses has been pointed out in several published evaluations of our PI projects as strength of the approach. Although counterparts are sometimes interested in reducing the number of individuals participating in the stakeholder



process, we feel that teams are a requirement for wider impact on the service delivery system and to achieve lasting changes in provider performance. All stages of the PI process are carried out by teams that vary in size depending on the amount of input needed to realize the performance improvement objective. Using teams at different stages also helps to ensure that we are working toward the goal of building PI capacity at the local level.

Standards

The article also states that QA/QI's emphasis on standards is "more systematic and comprehensive" than what is normally done in PI. Perhaps the nature of the wide stakeholder involvement in defining desired performance has obscured the common use of clinical or quality standards in the PI process. In PRIME II's PI literature and our normal practice of PI, international (typically from the World Health Organization) and national standards or service delivery guidelines serve as a critical reference in determining desired performance of service providers. We believe that PI's use of standards, while possibly different from QI/QA, is still systematic and comprehensive.

Potential for Success

A concluding comment in the article says, "QI/QA's more comprehensive and systematic process for developing, communicating, and implementing standards around those or similar factors appears more likely to achieve success, and successes are sustained longer if staff retain, refer to, and follow standards." Both approaches and projects strive to improve health worker compliance with standards. The similarities of

the approaches and the variations in the way they are applied in any one particular setting make it unlikely that one could infer that one approach is likely to be more successful than another. Much work remains to be done on making standards clear to providers so standards can serve as performance expectations. The PI approach in the PRIME II Project is being actively used in this endeavor to put standards into practice. Our experience to date is already providing us with impact within service delivery settings and among service providers that we classify as "successes."

Continuing the Dialogue

The commendable effort to illuminate similarities and differences among the various approaches and tools available for improving quality in healthcare will be best served by broadening the dialogue among projects, USAID cooperating agencies, and others. Indeed, PRIME II already is working with EngenderHealth to develop more definitive comparisons between COPE (client-oriented, provider-efficient services) and PI to better advise practitioners and healthcare managers in the field about the tools available to them to help address quality of care issues. We are pleased the PRIME II and the Quality Assurance Projects are planning a continuing dialogue that will result in a new joint publication that should provide a more complete comparison of the PI and QI/QA approaches. We look forward with eager anticipation to this joint publication and urge the readership of *QA Brief* to do so as well.





Quality Improvement and Cost

Hany Abdallah, MA, MHS, QA Project Specialist

FACED with financial constraints, health systems worldwide are looking for ways to control costs while ensuring an acceptable standard of quality for their clients. The issue of cost and quality is an area of focused attention within the Quality Assurance (QA) Project. In fact, over the past few years, the QA Project has coordinated a Cost and Quality Legacy Group devoted to synthesizing the QA Project's research, field experience, and knowledge in this area.

Several important issues arise when dealing with the cost and quality trade-off, including issues related to defining and understanding the nature of the link between quality improvement (QI) and cost. This article summarizes some of the QA Project's experiences in dealing with these issues; details can be found in specific publications or related products from the Legacy Group.

Definition of Quality in Cost Terms

What are we talking about when we talk about cost and quality? One of the objectives in the field of cost and quality is to define the cost of quality. The purpose of this analysis is to manage the trade-off between the cost of investments made in improving quality (e.g., through quality assurance) and the short- and long-term benefits obtained by reducing or eliminating poor quality. In this approach, quality is analyzed in cost terms by making "cost of poor quality" equivalent to the time and money spent on something that fails to help the client, and includes the cost of not doing things right the first time. Wareiss et al.¹ define the costs associated with quality as "those costs that would not be expended if quality was [sic] per-

fect." Tying these definitions to the QA Project's definition of quality ("Quality is compliance with standards"), the cost of quality includes two kinds of costs: (a) costs incurred in achieving/maintaining quality standards, and (b) costs resulting from not achieving/maintaining quality standards.

The challenge then is in defining costs and determining which costs are relevant to arriving at the cost-quality trade-off.² In simple terms, costs are considered as resources expended in providing a service (e.g., cost of medication, infection control practices). If the quality of health delivery is poor, these costs should reflect the cost of correcting errors (e.g., the cost of administering the wrong drug and correcting the error or of treating a patient for nosocomial infections) and the cost of inefficiencies in the process of care (e.g., cost of wasted personnel [and patient] time, repeating a prescription order necessitated by poor provider handwriting on the prescription form, or unnecessary waiting time by personnel because of poor process flow). However, it is also important to bear in mind that some costs associated with poor quality will be more difficult, though not impossible, to delineate (e.g., the cost of restoring a patient's health after initial faulty treatment).

Conceptual Understanding of the Quality Improvement and Cost Relationship

Several theoretical and empirical attempts have been made in the QI field to try to explain the complex relationship between cost and quality. Often, the assumption that improved quality requires additional resources is counterbalanced in several ways. First, additional resources do not guarantee improved qual-

¹ Wareiss, B.J., D.P. Pasternak, H.L. Smith. 1994. *Determining Costs Associated with Quality in Health Care*. Health Care Management Review (19) 3: 52–63.

² Reynolds, J., and K.C. Gaspari. 1986. *Cost-effectiveness Analysis*. PRICOR, Monograph Series, Method Brochure, No. 2.



ity (e.g., an investment in training may be lost if the work environment hampers the use of the newly developed skill). Second, the use of quality standards has the potential to reduce variation. In the QA field, a decrease in this variation is well-recognized as a principal approach to reducing wasted resources and, hence, saving costs. Finally, improved quality often leads to increased efficiency and reduced re-work, which in turn may result in saved resources.

Several theories in quality economics suggest that there is an inverse relationship between cost and quality. This concept relies on the belief that as quality increases, waste declines. This development promotes productivity; and improved productivity, in turn, implies that a product or service can be produced at a lower cost.³ Other theories suggest that the relationship is not just one-sided (i.e., quality controls cost) but is more dynamic and depends on both cost and quality. More specifically, two factors are important: (a) the availability or constraint of resources, and (b) strategies for providing care, i.e., how resources are used to provide care.⁴

This conceptual model embodies an important relationship between cost, quality, and efficiency. In this instance, the “ideal” healthcare provider is defined as one who “selects and implements the strategy of care that maximizes the health status improvement (or quality) without wasted resources.” In real life, where a provider works in a dynamic environment and is faced with daily challenges that affect his or her work, additions in cost can have different effects on quality. If the additional cost is due to a necessary element of care being acquired (e.g., providing a drug that was previously unavailable), the quality of care can be expected to increase. If, however, the additional cost

was spent on a harmful element (e.g., providing the wrong drug), quality may actually decline. Finally, there may be no effect on quality if the additional cost was incurred for something useless (e.g., a diagnostic test that contributes no insight into the patient’s medical condition).

One model for assessing the cost of QI is in net cost terms. This concept is captured in simplified terms in the QA Project Flowchart of Cost Recovery.⁵ The model makes quality improvement central to the design of a sustainable health system, and suggests that improvement in quality generates positive effects on net revenue for a health system both by lowering costs and increasing revenue (Figure 1).

This conceptual model suggests that revenues may be increased as quality of care promotes client (or patient) satisfaction, which, in turn, creates patient loyalty and increases patient willingness to pay (and pay more) for better quality service. The QA Project continues to examine the conditions under which this relationship is sustained. For example, a recent study in Ecuador is showing that improved compliance with technical guidelines may not, in the short run, improve clients’ perception of quality or their satisfaction levels: it may take time until improved compliance with quality standards brings improved outcome and changes in health status that the client can perceive and experience. The model also suggests that costs are reduced as quality increases efficiency through use of more cost-effective standards and through a positive motivation of health staff to “do the right things right the first time.” Understanding this relationship between the cost and benefit of QI has implications for the design of an effective healthcare delivery system in which the supply and demand

³ Ishikawa, K. 1985. *What is Total Quality Control?* Englewood Cliffs, New Jersey: Prentice-Hall.

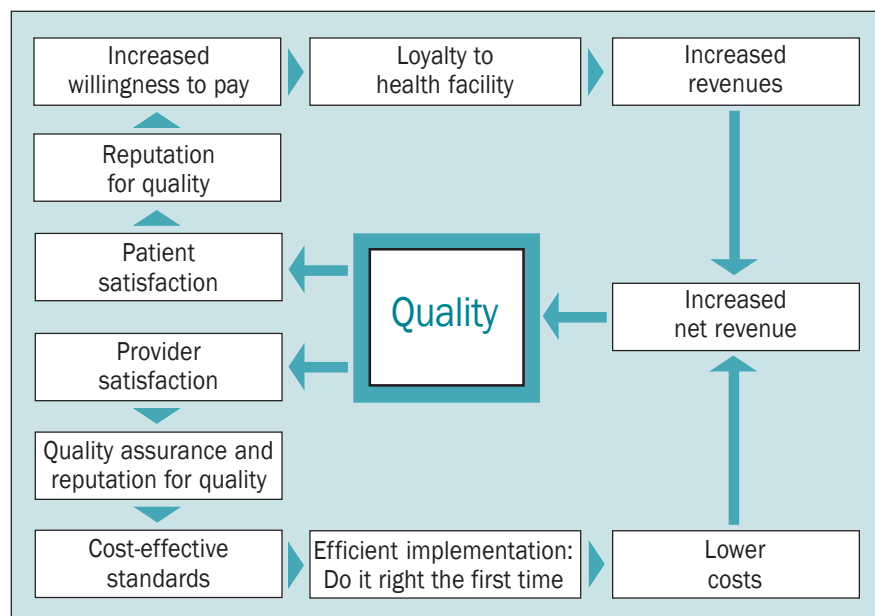
⁴ Donabedian, A., J.R.C. Wheeler, and L. Wyszewianski. 1982. *Quality, Cost and Health: An Integrative Model*. *Medical Care Review* 20 (10): 975–92. As quoted in S.T. Fleming. 1990. *The Relationship Between Cost and Quality of Hospital Care: A Review of the Literature*. *Medical Care Review* 47 (4): 487–502.

⁵ Wouters, A. 1993. “*Quality and Costs in Health Care Service Delivery for Developing Countries – A Three-Day Workshop*.” Published for the U.S. Agency for International Development (USAID) by the Quality Assurance Project: Bethesda, Maryland.



Figure 1

The Flowchart of Cost Recovery



forces are optimized to ensure a sustainable high-quality system.

Examples from the Field

The QA Project continues to deepen its understanding of the various aspects of the QI and cost relationship. Results from QA programs and operations research have shown that improving quality can lead to savings of limited resources. One recent operations research study conducted in Tver, Russia, for example, found that significant savings could be captured in the treatment of pregnancy-induced hypertension (PIH) without the additional investment of resources.⁶ The study

was specifically designed to measure the change in hospital care costs that resulted from using new guidelines for managing women with PIH. Changes included a rationalization of drugs and a reduction in hospital length-of-stay; the new system resulted in an 86 percent reduction in the cost of treating these women. This potential saving was achieved while the quality of care for the women was improved. Following the implementation of the new guidelines, none of the cases observed during the pilot progressed to stages of eclampsia, and no maternal deaths were recorded, whereas seven deaths had occurred in the equivalent time period prior to the implementation of guidelines. Benefits

also extended to the babies of the women with PIH, with a 60 percent reduction in complications among the newborns. Another study of providers in Niger using the Integrated Management of Childhood Illness (IMCI) algorithm suggested that the highest levels of compliance with IMCI standards were correlated with a 30 to 60 percent potential cost savings in drugs and personnel time costs.⁷

In the QA program in Malawi, one QI team working in a small rural clinic observed that its QI efforts also had a beneficial impact on resource availability and staff productivity.⁸ To reduce the number of patients with malaria returning within a week for treatment of

⁶ Abdallah, H., O. Chernobrovkina, A. Karatkova, R. Massoud, and M. Scheglova. Forthcoming. *The Impact of New Evidence-Based Clinical Guidelines on the Cost of Managing Pregnancy-Induced Hypertension in Hospitals, Tver, Russia*. Operations Research Results. To be published for the U.S. Agency for International Development (USAID) by the Quality Assurance Project: Bethesda, Maryland.

⁷ Kelley, E., C. Geslin, S. Djibrina, and M. Boucar. 2000. *The Impact of QA Methods on Compliance with the Integrated Management of Childhood Illness Algorithm in Niger*. Operations Research Results 1(2). Published for the U.S. Agency for International Development (USAID) by the Quality Assurance Project: Bethesda, Maryland.

⁸ Shabahang, J. Forthcoming. *Using Team-Based Problem Solving to Improve Compliance with Malaria Treatment Guidelines in Malawi*. Quality Assurance Project Case Study. To be published for the U.S. Agency for International Development (USAID) by the Quality Assurance Project (QAP): Bethesda, Maryland, U.S.A.



the same symptoms (mainly owing to poor compliance to their initial malaria treatment), the team administered the recommended treatment for malaria (sulfadoxine-pyrimethamine or SP) as directly observed therapy (DOT). The intervention resulted in a significant reduction in the number of returning patients as well as up to a \$181 saving in SP doses. With this saving, 2,013 new malaria patients could be treated, or other important supplies or equipment could be purchased by the health center. The DOT intervention also led to savings in health worker time and other benefits related to fewer complications from malaria. By seeing fewer reattendants in the 12-month period following the introduction of DOT, the potential productivity of the health center staff was increased by 235 hours or 29 person-days. It also is expected that the DOT intervention would have a positive effect on patient outcome. A patient who takes his SP dose according to the DOT procedure is more likely to recover from malaria and not suffer complications that can be a result of patients' failing to take the drug or taking an incomplete dose. Fewer complications from malaria mean reduced suffering for patients, as well as savings in the costs associated from lost work time.

The QA Project has also investigated methods for using cost analysis and management tools in guiding QI efforts. For example, in a study in Peru, the project tested an activity-based cost accounting system for allocating costs in a non-governmental healthcare provider operating a network of small clinics.⁹ The method showed the potential for capturing more than \$35,000 in activities that are not considered to add to

the quality of health services delivery (e.g., unnecessary waiting time of staff, repetition of work). In Ecuador, the QA Project also tested the usability of a simple, rapid methodology for measuring the level of inefficiency in the use of laboratory resources in three public hospitals. The measurements uncovered an opportunity to save 20 to 50 percent of laboratory resources by reducing inefficiencies (\$2,600 to \$30,000 depending on the hospital). Important sources of savings included increased productivity of staff, appropriate staffing, monitoring of the high purchase price of test reagents and materials, and rationalizing the use of tests in the clinical management of selected conditions.

Cost and Cost-Effectiveness of Quality Improvement

What, then, is the optimal level of investment in quality improvement? The answer, of course, depends on the particular quality approach or tool used (e.g., training, QI teams, accreditation systems), the specific context in which quality is being improved (e.g., in a hospital, in a clinical-related area, at a regional/national level), and the degree of readiness of the individuals and organization to implement changes to improve quality. Where possible, the QA Project has tried to document this cost, either formally as part of a program evaluation¹⁰ or an operations research investigation,^{7, 11} or informally as a way of evaluating the effectiveness of QI interventions in the QA Project programs. The Cost and Quality Legacy Group continues to monitor and synthesize developments in this and other areas in the cost and quality field.

⁹ Waters, H., H. Abdallah, D. Santillán, and P. Richardson. 2000. *Application of activity-based costing (ABC) in a Peruvian NGO health care system*. Operations Research Results 1(3). Published for the U.S. Agency for International Development (USAID) by the Quality Assurance Project (QAP): Bethesda, Maryland.

¹⁰ Legros, S., Y. Tawfik, X. Crespin, M. Djingarey, E. Goodrich, and H. Abdallah. 2000. *The Niger QAP/BASICS Joint Project: Final Evaluation*. Evaluation Report 1(1). Published for the U.S. Agency for International Development (USAID) by the Quality Assurance Project: Bethesda, Maryland.

¹¹ Kim, Y.M., F. Putjuk, A. Kols, and E. Basuki. 2000. *Improving Provider-Client Communication: Reinforcing IPC/C Training in Indonesia with Self-assessment and Peer Review*. Operations Research Results 1(6). Published for the U.S. Agency for International Development (USAID) by the Quality Assurance Project: Bethesda, Maryland.



Tuberculosis Computer-Based Learning Tool Garners User Acclaim

*Donna Vincent Roa, PhD, Director of Communication and Associate Project Director, Quality Assurance Project,
and Elisa Knebel, MHS, Quality Assurance Specialist*

RESULTS of a recent user survey on the Tuberculosis (TB) Case Management CD-ROM administered by the QA Project to 176 customers in over 30 countries have been overwhelmingly positive. Launched in September 2000, this computer-based learning tool created by the QA Project, trains health professionals in preventing, diagnosing, and treating tuberculosis.¹

Of the 10 percent who responded to the survey (mostly medical doctors and TB specialists), a majority was satisfied with the program and found it comprehensive and easy to use. One Zambian lab specialist reported, “I am very satisfied with the quick and easy communication of the material.” Another user, a physician and Russian TB specialist, explained, “It was very easy to use (and included) clear explanations of different issues. It is a new method of education, which is acceptable for participants and (offers the) possibility for self-education and repetition.”

When asked if the TB CD-ROM had contributed to an effective transfer of information, over half of the respondents said yes. Most were pleased with the use of graphics, the user tests, the algorithm of treatment, and the case studies. One respondent noted, “listening to the voice and looking at the pictures...is an effective way of transferring information on TB case management.”

One challenge that program developer Dr. Marina Budeyeva faced in designing the program was making sure the program met the needs of two distinct audiences: novices needing initial training in TB case management and experienced TB professionals desiring a refresher on the topic. Responses from the survey indicate that the product achieved this goal. One physician said that the product “is beneficial for newcomers to TB work and also helps to correct awareness of TB health workers,” and happily, “not even TB professionals can complete all the answers in the test correctly.”

The QA Project is pleased to see both the large number and diversity of users employing and planning to employ the

tool (e.g., medical doctors, nurses, midwives, village doctors, physician’s assistant, health workers, students, health reporters, writers). One TB program manager from China is planning use the program to train over 5,000 public health professionals at varying experience and educational levels. Other notable facts from the survey include the following:

- On average, respondents took 2-4 hours to complete the CD-ROM
- The product was used a stand alone training tool, with facilitation, and as part of pre-service training
- Half of the respondents provided incentives for those completing the CD-ROM

Survey Respondents From:

■ Bangladesh	■ Israel	■ Nigeria
■ Canada	■ Kazakhstan	■ Pakistan
■ China	■ Kenya	■ United States
■ India	■ Namibia	■ Vietnam
■ Indonesia	■ Nepal	■ Zambia

¹ This program uses the WHO Directly Observed Treatment Short course protocol.



- Computer access and appropriate disk space for the program still remains an issue in some places²

Several respondents offered suggestions on how the product could be changed to improve its usability:

a) include more information on pediatric tuberculosis case management, b) provide programming that allows users to “go straight into the test room to test their knowledge without being forced to take the tutorials,” c) expand the chapter on epidemiology to include statistics on high burden countries like India, South Africa, Nigeria, and Pakistan, d) expand the DOTS chapter with more details of actual field situations, e) include more information on the side effects of anti-TB drugs, f) conduct another formal study, g) provide a video version of the program, and h) create a printable certificate for the user who completes the program.

In addition to this positive user feedback, the program has received several industry distinctions, including the 2001 IABC Silver Inkwell Award of Merit for Best

Product Launch, the 2001 Communicator Print Media Crystal Award of Excellence in Computer-Based

Training, the 2000 Learning Software Design Competition Award for Computer-Based Training Design, and the 1999 Gold Cinema in Industry (CINDY) Award.

The Tuberculosis Case Management CD-ROM can be purchased from the QA Project for \$42.50 (includes shipping and handling). If you are interested in receiving a copy of this product, send an e-mail to qapdissem@urc-chs.com, or for more information call 301-941-8524. This pricing applies only to orders from North America and Western Europe. Individuals from Africa, Asia, the Caribbean,

Eastern Europe, and Latin America may receive a single copy free upon request. Quantity discounts are available.

Respondents' Position Titles

- Professor and Doctor-in-Chief
- TDR/WHO Project Principal Investigator (TB-Socio-Economic Research)
- Physician - 5
- Public Health Physician - 2
- College Professor
- Chest Physician
- TB Epidemiologist and Research Coordinator of the National TB Control Program
- Biomedical Scientist and Laboratory Specialist
- Medical Doctor, PhD, and TB Specialist
- Centre for Health Policy and Strategic Studies Director and Professor
- Medical Doctor and Chief, Infectious Disease
- Public Health and Nutrition (Program) Advisor



² “...because in my district, only seven of 40 health centers have computers to operate the CD-ROM.” Another respondent explained, “This CD-ROM is an excellent training tool. Unfortunately in India the health worker(s) have no access to computers, and training center classrooms are also without computers. We intend to use it by circulating this CD amongst doctors (about 25% doctors in our state have PCs at home).”



CBT Successfully Teaches the IMCI Approach

Marina Budeyeva, MD, MPH, Senior QA Advisor

OF the 12 million child deaths in developing countries, seven in 10 are caused by acute respiratory infections (mostly pneumonia), diarrhea, measles, malaria, or malnutrition. Usually, sick children present with symptoms of more than one of these conditions. Thus, an integrated approach to managing sick children is needed, as well as a methodology that addresses children's overall health and promotes prevention of childhood illness.

To meet this need, the World Health Organization (WHO), in collaboration with UNICEF, developed the Integrated Management of Childhood Illness (IMCI) strategy that combines improving management of childhood illness with proper nutrition and immunization, prevention of diseases, and promotion of growth and development.

One of the IMCI strategy components is improvement of healthcare providers' case management skills through the use of locally adapted guidelines. In a step-by-step process, these guidelines train health staff in developing countries to assess, classify, and treat sick children, and to counsel caretakers.

With funding assistance from the U.S. Agency for International Development (USAID), the Quality Assurance (QA) Project designed and tested an interactive computer-based training (CBT) product on compact disk to teach these IMCI guidelines. The goals of this CD-ROM are to:

- Shorten the standard in-service IMCI training course
- Provide refresher or pre-service training
- Expand the reach of IMCI training to health professionals who are not typically included in the standard training course

Results from a field test in Uganda indicated no difference, in either knowledge or competence, between those trained in IMCI using the computer-based

training product and those taking the traditional classroom-based course. Furthermore, the CBT course is approximately 20 to 25 percent less expensive, because it requires only nine days (the traditional course takes 11 days) and fewer facilitators.

Currently, work is underway to revise and update the original CD-ROM. The target audience for this computer-based program remains healthcare providers in developing countries who typically have little or no computer experience. The new version includes a more modern interface, additional tutorials, several case studies, additional functionality and interactivity, a glossary, and a library. The new version also will include an underlying structure that will make the production of future versions (in different languages and for different regions) easier and less costly.

In the development of the new version, the QA Project is collaborating closely with WHO's division of Child and Adolescent Health (CAH/WHO). CAH/WHO provides technical content expertise as well as funding assistance. The prototype of the program was tested at the CAH/WHO in 2000. Additional interactive features were added to the program as a result of the feedback received during this testing of the prototype.

Testing of the program will be conducted in India in January and February in 2002. It will include examining the following areas: technical operation, ease of use, navigation, cognitive load, mapping, screen design, information presentation, media integration, instructional design, and attitude. The expected delivery date is May 2002.

Adaptation of the CD-ROM into Spanish (for training in Bolivia) has been planned and funded by USAID. The development of this version will begin the fall of 2001 and is expected to be completed in May 2002.





New Products from the QA Project

QA Monograph Series

Rashad Massoud, Karen Askov, Jolee Reinke, Lynne Miller Franco, Thada Bornstein, Elisa Knebel, and Catherine MacAulay. 2001. **A Modern Paradigm for Improving Healthcare Quality.**

Operations Research Issue Paper Series

Sujata Bose, Elizabeth Oliveras, and Wendy Newcomer Edson. 2001. **How Can Self-Assessment Improve the Quality of Healthcare?**

Lani Marquez. 2001. **Helping Healthcare Providers Perform According to Standards.**

Elisa Knebel. 2001. **The Use and Effect of Distance Education in Healthcare: What Do We Know?**

Neeraj Kak, Bart Burkhalter, and Merri-Ann Cooper. 2001. **Measuring the Competence of Healthcare Providers.**

All QA Project publications are published for the U. S. Agency for International Development (USAID). They can be downloaded from the QA Project website: <www.qaproject.org>.

Documents that are not "website only" are available in hard copy: write to <qapdissem@urc-chs.com>.

Quality Assurance Project Case Study Series

Ya-Shin Lin and Lynne Miller Franco. 2000. **Assessing Malaria Treatment and Control at Peer Facilities in Malawi.** (Website only)

H. Durán and S. Fuentes S. 2000. **Designing Obstetric Services to Reduce Maternal Mortality in Guatemala.** (Now available in Spanish, website only)

Quality Assurance Project. 2000. **Designing and Integrating Quality Family Health Services at the Salt Model Center in Jordan.** (Website only)

Ya-Shin Lin and Lynne Miller Franco. 2000. **Assessing the Quality of Facility-Level Family Planning Services in Malawi.** (Website only)

Quality Assurance Project. **Assessing Quality of Healthcare at the District Level in Rwanda.**

Ya-Shin Lin. 2000. **Using Screening Data to Improve Hypertension Care in Russia.** (Website only)

Project Report Series

Catherine MacAuley and Mahadeo P. Verma. 2001. **The Global Polio Laboratory Network: A Model for Good Laboratory Practice.** (Website only)

Anbarasi Edward Raj. 2001. **Strengthening the Capacity of African Institutions for Improving the Quality of Nutrition Programs: Final Report of the Greater Horn of Africa Initiative.** (Website only)

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